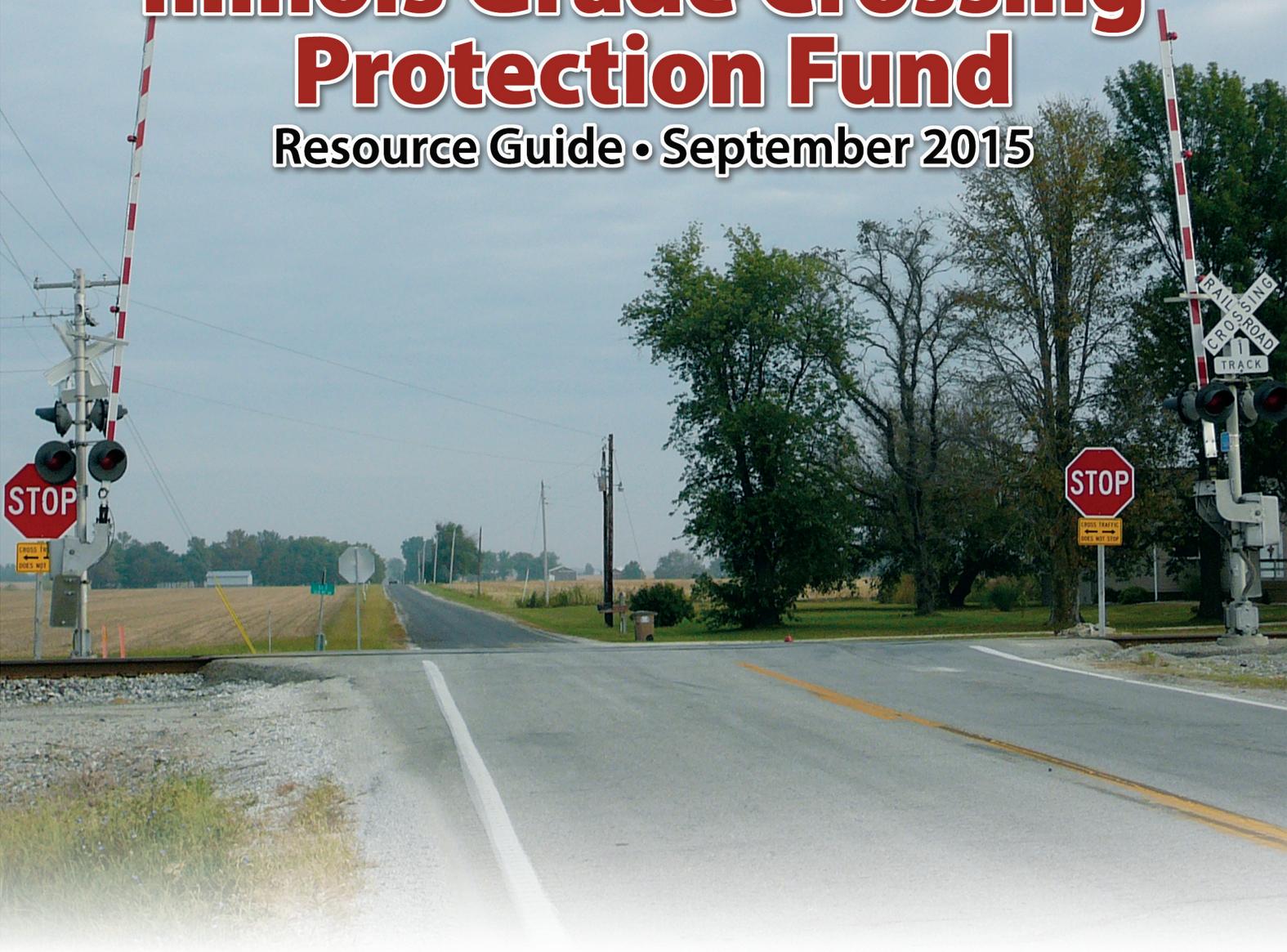




Illinois Grade Crossing Protection Fund

Resource Guide • September 2015



Published by Illinois Department of Transportation
Bureau of Local Roads and Streets

Prepared in Conjunction with the
Illinois Commerce Commission Railroad Safety Section

Springfield, IL

September 2015

FOREWARD

DOCUMENT CONTROL AND REVISION HISTORY

The Illinois Grade Crossing Protection Fund Resource Guide is reviewed as needed. Changes to this manual are approved by the Bureau of Local Roads and Streets and the Illinois Commerce Commission.

Distribution

This manual is available in the Illinois Technology Transfer Center's library as a Portable Document Format (PDF) on the Center's web site. Hard copies are also available.

Revision History

The Bureau of Local Roads and Streets maintains archived copies of the manual since 1992.

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Introduction

The Grade Crossing Protection Fund (GCPF), appropriated to the Illinois Department of Transportation (IDOT) but administered only upon order of the Illinois Commerce Commission (ICC), was created by state law in 1955 to assist local public agencies (LPAs) - counties, townships and municipalities - in paying for safety improvements at highway-rail crossings on local roads and streets. The GCPF cannot be used on State routes. Through a cooperative effort of the ICC, IDOT, the railway companies, and LPAs, crossing locations where safety improvements are necessary are identified and, when possible, assistance from the GCPF is used to help pay for corrective measures. Assistance from the GCPF can only be used for safety improvements at public highway-rail crossings located on the local road system. IDOT, utilizing federal funds, also pays for safety improvements at public highway-rail crossings located on the local road system as well as on the state road or highway system.

Currently, \$3.25 million in state motor fuel tax receipts is transferred each month from the Motor Fuel Tax (MFT) fund to the GCPF. This amount provides the GCPF with \$39 million annually to be used for safety improvements at highway-rail crossings on local roads and streets. The GCPF is typically used to help pay for the following types of projects:

- **Warning Device Upgrades:** Installation of automatic flashing light signals (AFLS) and gates (AFLS&G) at public grade crossings currently not equipped with automatic warning devices; installation of AFLS&G at public grade crossings currently equipped only with AFLS; signal circuitry improvements at public grade crossings currently equipped only with automatic warning devices;
- **Grade Separations - New and Reconstructed:** Construction, reconstruction, or repair of bridges carrying a local road or street over railroad tracks (overpass); construction from touchdown to touchdown, reconstruction, or repair of bridges carrying railroad tracks over a local road or street (subway);
- **Grade Separations - Vertical Clearance Improvements:** Lowering the existing highway pavement surface under a railroad bridge to improve vertical clearance for motor vehicles;
- **Pedestrian Grade Separations:** Construction of a bridge to carry pedestrian/bicycle traffic over or under railroad tracks;
- **Interconnects:** Upgrading the circuitry at grade crossings where warning signals are connected to the adjacent traffic signals so that the two systems operate in a synchronized manner;
- **Highway Approaches:** Improvements to the portion of the public roadway directly adjacent to the crossing surface;
- **Connecting Roads:** Construction of a roadway between a closed crossing and an adjacent open, improved crossing;
- **Voluntary Crossing Closures:** Provide an incentive payment to local agencies for the voluntarily closure of public highway-rail grade crossings; and
- **Crossing Surface Renewals:** Up to \$2 million in assistance annually can be allocated for crossing surface improvements.

[Note: Other types of improvements, including some limited-scope improvements at pedestrian-rail grade crossings on existing sidewalks, may be eligible for GCPF assistance as recommended and approved by the ICC on a case-by-case basis, subject to availability of GCPF assistance.]

This booklet has been cooperatively prepared by the ICC and IDOT to serve as a resource guide to help LPAs in the planning, design and application for GCPF assistance to help pay for safety improvements at public highway-rail crossings located on the local road system. This booklet does not constitute a state standard or policy. Where possible, this booklet references existing standards and policies already adopted in Illinois. Each highway-rail crossing is unique and potential treatments should be selected based on the individual factors of the highway-rail crossing location.

Administration of the Illinois Grade Crossing Protection Fund

How are GCPF Projects Identified and Selected?

Annually, the ICC's Rail Safety Section (ICC Staff) receives numerous applications from local communities and railroads seeking assistance from the GCPF for safety improvements at public highway-rail crossings on local roads and streets. ICC Staff also compiles and analyzes crossing-specific data for every public highway-rail crossing in Illinois. The crossing-specific data is obtained from various sources including the railroads, IDOT, LPAs and engineering surveys commissioned by the ICC. A smaller pool of candidate projects is then identified from the applications and data analysis, which are further prioritized based upon criteria, including the safety history of the existing crossing and the volume and types of existing train and highway traffic at that crossing. Finally, geographic location is also taken into account so that safety improvements throughout the state can be addressed as equitably as possible by region.

Projects are then selected for ICC's Crossing Safety Improvement Program (CSIP) 5-year Plan, which is required to be approved by the Commission and published by the first week of April of each year. This process is repeated prior to each subsequent state fiscal year (July 1 - June 30). Projects not selected for the CSIP in the current fiscal year are considered again as part of future CSIP 5-year Plans. A copy of the most current CSIP 5-year Plan, as well as archived CSIP 5-year Plans, can be found on the ICC's website at the following link under the "Reports" heading:

<http://www.icc.illinois.gov/railroad/CrossingSafetyImprovement.aspx>

How Do You Apply for the GCPF?

If a LPA would like to submit a project for consideration as part of the CSIP, a GCPF project application may be downloaded from the ICC's website at the above link under the "Forms" heading, or call (217) 782-7660. You may also request a copy by writing to the Railroad Safety Section, Illinois Commerce Commission, 527 E. Capitol Avenue, Springfield, IL 62701.

Separate applications are available for highway-rail grade crossings, highway-rail bridges, or pedestrian-rail bridge projects. Please prepare a separate application for each project you wish to have considered for the CSIP. All applications are held for 5 years. If a GCPF project application is not selected for the CSIP in the current fiscal year, it will be considered again as part of future CSIP 5-year Plans. If a GCPF project application is not selected for the CSIP within 5 years, ICC Staff will contact the project sponsor and ask if they are still interested in pursuing the proposed safety improvement. If so, the project sponsor is asked to submit a new GCPF project application.

How is the GCPF Administered and Payment Distributed?

Once a project is included in the CSIP, an ICC Order is necessary to obligate the GCPF assistance for distribution. GCPF assistance is normally provided on a reimbursement basis. Distribution of payments occur only after an ICC Order is entered and IDOT receives, reviews, and approves invoices of the eligible costs incurred by the LPA or railroad seeking the GCPF reimbursement.

What is an ICC Order?

An ICC Order is a legal document by which the ICC requires specific work to be completed and assigns costs and responsibilities to specific parties in a matter. ICC Orders contain a required completion date for the work assigned to each party and a division of costs. In cases where GCPF assistance is allowed, the ICC Order sets a “not-to-exceed” (NTE) limit for GCPF assistance.

An ICC Order can be initiated by one of two methods: 1) the Stipulated Agreement method; or, 2) the Petition method. The Stipulated Agreement method is the most common procedure for initiating an ICC Order to obligate GCPF funding. The Petition method is required by Illinois law in certain instances, and typically requires an ICC hearing before an Administrative Law Judge, which includes the presentation of evidence to support the petition by the petitioning agency. As such, the Petition method is typically lengthier and may require representation by legal counsel. Each method will be explained separately. Individual conditions will dictate which procedure is appropriate.

Stipulated Agreement and Petition Methods for GCPF Assistance

Method 1 – Stipulated Agreement

When can the Stipulated Agreement Method be used?

The installation of automatic warning devices may be recommended under Stipulated Agreement procedures when any of the following conditions are met or exceeded:

1. The product of the seasonally adjusted average daily traffic count (AADT) and the average daily train movements (i.e. trains per day (tpd)) exceeds three thousand (3,000);
2. The stopping or clearing sight distances for normal highway conditions, as shown in Appendix 3, are restricted and the train-vehicle product (tpd x AADT) exceeds 1,000;
3. The crossing has a pronounced crash history;
4. The crossing contains multiple main line tracks where there is a possibility of simultaneous train movements over the crossing;
5. One or more siding tracks exist in the vicinity of the main line track(s), which may be occupied by a standing train or locomotive so as to obscure the movement of another train approaching the crossing;
6. Frequent usage of the crossing by vehicles carrying hazardous material, which may pose a hazard to train crew members or passengers;
7. Unusual highway/track geometrics or vehicle/train operations create a hazardous condition which cannot be reasonably improved by other means.

The Stipulated Agreement Method may also be used for the following conditions:

1. Reconstruction or alteration of an existing public grade separation structure that does not result in a change of the structure's footprint, or anticipated costs to the GCPF in excess of \$1 million;

[Note: A structure with the same footprint means the new structure has the exact same location and size of piers/abutments and meets all applicable vertical and horizontal track clearance requirements of [92 Ill. Adm. Code 1500.160c.](#)]

2. Upgrade of automatic warning device control circuitry and/or hardware with anticipated costs to the GCPF not to exceed \$1 million, typically accomplished as a corridor improvement including multiple existing public grade crossings;
3. Reconstruction of the crossing surface at an existing public grade crossing;
4. The improvement, reconstruction or minor realignment of the highway approaches at an existing public grade crossing;

[Note: Any highway approach widening or realignment resulting in costs and work for the railroad to widen or relocate the existing crossing surface or relocate the existing warning devices is the sole responsibility of the LPA under the requirements of [92 Ill. Adm. Code 1535.207c.](#)]

5. Voluntary public crossing closures accomplished by the legal action of the LPA to vacate and remove/barricade the existing highway approaches on both sides of a public crossing;

[Note: If, after preliminary public discussion, the LPA determines it will seek GCPF incentives to vacate a public highway in order to eliminate an existing public highway-rail grade crossing, the

LPA must submit a letter of request to the ICC's Rail Safety Program Administrator, who will respond to the request. If a GCPF closure incentive request is accepted, the ICC RSS will prepare and circulate a Stipulated Agreement to the necessary parties. After receiving the Stipulated Agreement, the LPA will proceed with the required public notice(s)/hearing(s) required by the applicable [Illinois Compiled Statutes](#) for the specific type of highway authority. The LPA must return a copy of its formal vacation documents with the executed Stipulated Agreement. The formal vacation documents must include a statement that the effective date of the vacation will occur on or after the date of a Commission Order authorizing the GCPF incentive payment.

The LPA's final vacation and physical closure of the public highway must not occur until after the ICC Order is issued. Otherwise, the LPA is not eligible to receive the GCPF closure incentive payment, and may potentially lose other incentive payments. It is recommended the LPA contact the ICC RSS prior to submitting a letter of request to discuss proper adherence to the necessary legal processes. The ICC RSS will provide examples of prior vacation documents upon request.]

6. Construction of a connecting road between a closed crossing and an adjacent open, improved public crossing, provided that anticipated costs to the GCPF do not exceed \$1 million for the overall improvement.

[Note: GCPF voluntary crossing closure incentives are not allowed in addition to GCPF assistance to construct a connecting road on the same or associated projects.]

7. Any other improvements programmed to receive GCPF assistance for which the petition method is not required by state statute, and anticipated costs to the GCPF do not exceed \$1 million in total.

Who prepares the Stipulated Agreement and how does it become an ICC Order?

When the Stipulated Agreement method is used, the ICC Rail Safety Section prepares and distributes a stipulated agreement for signature by all of the parties. The stipulated agreement will include the scope of work, who will perform the work, division of cost, deadlines, etc. The parties then have 60 days to execute the agreement and return it to the ICC for processing. Once all of the signatures are received, the ICC Rail Safety Section submits the executed stipulated agreement for docketing and the case receives an ICC docket number. Finally, after docketing, the ICC Rail Safety Section Staff prepares a draft ICC Order incorporating the terms of the Stipulated Agreement and then submits it to the Commission for its approval and entry as a Final Order at a regularly scheduled open public meeting of the ICC, called a Bench Session.

Method 2 – Petition

When is the Petition Method required?

In certain instances, a Petition, followed by a hearing with the ICC, is necessary. The following are examples of when a petition is required:

1. Establishment of a new public highway-rail grade crossing (may include adjacent pedestrian sidewalk(s) or pathway(s) within the public roadway right-of-way/easement);
2. Addition of public pedestrian sidewalk or pathway grade crossing(s) within the public roadway right-of-way/easement; at an existing public highway-rail grade crossing that did not previously have any dedicated pedestrian/bicycle accommodations;

[Note: New or existing pedestrian sidewalk or pathway grade crossing(s) that are not located on the LPA's public roadway right-of-way/easement do not fall under the ICC's jurisdiction and are not eligible for GCPF assistance. However, they may be eligible for federal rail safety funds. For more information on federal funding options, contact the Rail Safety Unit of IDOT's Central Bureau of Local Roads and Streets (BLRS). The LPA should seek a "Construction Agreement" with the appropriate railroad for addressing the design, construction, and maintenance costs and responsibilities associated with such crossings.]

3. New Construction of a grade separated structure or reconstruction of a grade separated structure resulting in a change of the structure's footprint;

[Note: A petition, stipulated agreement, or ICC Order is not required for "Maintenance" projects (i.e., replacement of the deck on an existing structure, etc.). Also, a petition, stipulated agreement, or ICC Order is not required when an existing structure will be replaced with a new structure having the exact same location and size of piers/abutments and meeting all applicable vertical and horizontal track clearance requirements of [92 Ill. Adm. Code 1500.160c](#), provided no GCPF assistance is being requested. The LPA should submit plans to the ICC Rail Safety Section and the railroad(s). Agreement(s) with the railroad(s) for railroad flagging and protective liability insurance may be required by the railroad(s).]

4. Establishment of a highway-rail interconnect where crossing warning signals are to be connected to the adjacent traffic signals so that the two systems operate in a synchronized manner;
5. Installation of automatic warning devices at a crossing with less than 2 trains per day, or at a crossing that does not meet the minimum qualifying conditions for a Stipulated Agreement previously listed;
6. When one of the parties involved is unwilling to execute a Stipulated Agreement previously listed;
7. Any other improvements programmed to receive GCPF assistance for which anticipated costs to the GCPF exceed \$1 million in total.

How do I file a Petition with the ICC?

The procedural rules of practice for filing a petition and presenting a matter before the ICC are covered under [Title 83, Part 200](#) of the Illinois Administrative Code. The petitioner is the party requesting the improvement, which in most instances would be the LPA, the railroad, or IDOT. It is recommended that the petitioner seek legal counsel in the preparation and filing of a petition. Example formatting for a typical petition is contained in Appendix 4.

What happens after a Petition is filed?

Upon receipt and review of a Petition, the ICC sends out a notice of the date, time, and place of the hearing to the parties of record.

ICC hearings are conducted in a manner similar to that of a court trial with a court reporter, but on a more informal basis. During the course of the hearing, each party has the opportunity to express their support or concerns regarding the proposed safety improvement. The petitioner typically presents witnesses and testimony, as well as exhibits, in support of their Petition at the hearing. A court reporter is present at the hearing.

What evidence should be presented at the hearing?

The evidence to be presented at a hearing depends upon the nature of the improvement (i.e., new crossing, new grade separation, approach improvements, etc.). In general, the petitioner prepares and files exhibits when the Petition is filed that typically include a location map, plans and cost estimates for the improvement. To be admitted as evidence, these exhibits need also be presented at the hearing and entered by the Administrative Law Judge (ALJ). Witnesses typically testify and/or exhibits are presented to establish all pertinent information relating to why the proposed improvements are needed. Information regarding the schedule and nature of roadway work is presented if there will be a roadway project in connection with a proposed crossing warning device improvement. Normally, the railroad has someone present who may testify or stipulate with regard to train traffic and the estimated cost of warning devices and/or crossing surface work. However, it is recommended that the LPA seek and/or confirm this information with the railroad prior to the hearing.

In most instances, the recommended minimum information desired for the record at the hearing is as follows, although additional information may be required by the ALJ:

1. General location map and preliminary project plans.
2. Number and type of tracks (main, passing, industrial, etc.) at each crossing involved.
3. Nature of highway(s) (jurisdictional & maintenance responsibilities, roadway functional classification, etc).
4. Character of highway(s):
 - a. Surface material, width, and number of traffic lanes;
 - b. Condition of roadway surface (good, fair, poor);
 - c. Approach grades (whether or not they conform to [92 Ill. Adm. Code 1535.204](#));
 - d. Angle of crossing;
 - e. Other issues or comments (right-of-way, terrain, drainage difficulties, etc.).
5. Condition, description, and width of crossing surface (whether or not the crossing surface(s) conform to the minimum requirements of [92 Ill. Adm. Code 1535.203](#)).
6. Characteristics of surrounding area (rural or urban; residential, commercial or industrial; distance and traffic control devices at intersections within 500' of the crossing, etc.).
7. Sight distance obstructions at crossing (buildings, trees, fences, etc., limiting visibility but not located on railroad or LPA right-of-way).
8. Vehicular traffic information:
 - a. Seasonally adjusted average daily traffic count (AADT);
 - b. Posted or statutory vehicle speed limits at crossing;
 - c. Character of vehicles (passenger vehicles, commercial trucks, etc.);
 - d. Usage patterns (local, regional, statewide);
 - e. School bus, emergency vehicle, and/or hazardous material use at crossing.

9. Railroad operational information (supplied/confirmed by the railroad company):
 - a. Number and nature of train movements per day (trains per day; tpd) at the crossing (thru trains, switching, mainly day time or night time operations, etc.);
 - b. Maximum time table speed;
 - c. Possibility of two trains approaching or occupying the crossing at the same time (if the crossing has two or more tracks);
 - d. Character of trains (passenger, freight, etc.).
10. Crossing crash/incident history.
11. Existing warning devices.
12. Proposed improvement(s) and estimated cost for installation and future maintenance.
13. Proposed or agreed division of installation costs and work, as well as division of future maintenance costs and responsibilities.

In Petition cases where GCPF assistance has been programmed in the CSIP and all parties are in agreement on the nature and cost division of the proposed improvements, it is common for the LPA to work with the railroad before filing the Petition to reach a written “construction agreement” between the two (not the same as an ICC Stipulated Agreement) to govern the work to occur on the railroad’s right-of-way, as well as any railroad flagging and insurance requirements of the railroad and the costs thereof. This sort of advance negotiation and agreement between the LPA and the railroad can shorten the ICC hearing process considerably. The LPA typically begins advance negotiation for an agreement with the railroad up to a year or more prior to filing a Petition with the ICC.

What happens after the hearing is held?

Normally, the sequence of events after the hearing is as follows:

1. The ALJ either denies the Petition or marks the record “Heard and Taken” and typically issues a Proposed Order for the review of the parties. In cases where all parties are in agreement on the nature and cost division of the proposed improvements, the parties and ICC Rail Safety Staff sometimes prepare a Draft Order/Stipulation (often referred to as Agreed Order) for the ALJ’s review and editing and waive issuance and review of a Proposed Order.
2. When a Proposed Order is issued by the ALJ, the parties are allowed time for Briefs on Exceptions to the Proposed Order if one or more parties do not agree with the Proposed Order terms. If all of the Proposed Order terms are agreed to by all of the parties, the parties sometimes file Responses of Concurrence to the ALJ’s Proposed Order, which may reduce or eliminate the time period for Briefs on Exceptions.
3. Once the allowed time period for Briefs on Exceptions to be submitted has concluded, the ALJ submits the Proposed Order to the Commissioners for approval and entry as a Final Order at a regularly scheduled Bench Session.

What if I am not sure which method is required?

In most instances, if a project is included in the CSIP and the anticipated GCPF assistance is less than \$1 million, the ICC Rail Safety Section prepares and distributes a Stipulated Agreement for signature by the parties during the Fiscal Year for which the project has been programmed. Otherwise, if a project is included in the CSIP and the anticipated GCPF assistance is greater than \$1 million or the Petition Method is required by Illinois statute, the ICC Rail Safety Section typically reminds the party desiring the crossing improvements to file a Petition at or near the beginning of the Fiscal Year for which the project has been programmed.

In any event, when a project is included in the CSIP and the party desiring the crossing improvements is not sure which method will be required, it is recommended to contact the ICC Rail Safety Section at (217) 782-7660 for a determination. Questions may also be submitted to the ICC via email to railsafety@icc.illinois.gov.

Typical Cost Divisions for Safety Improvements Eligible for GCPF Assistance

Below are typical cost divisions for some of the most common types of highway-rail crossing improvements which are eligible for GCPF assistance. The typical cost divisions are shown for informational purposes only. Final cost divisions are recommended by the ICC Rail Safety Section following a review of each individual project.

Improvement	GCPF ⁽¹⁾	LPA	Railroad
Install AFLS&G at an existing public crossing currently not equipped with automatic warning devices	85% - Typ. contribution 90-95% - If Highway Approach Improvements are necessary and funded 100% by LPA; if LPA agrees to close an existing crossing; or, if LPA provides evidence of financial hardship	10% - Typ. contribution 0-5% - If Highway Approach Improvements are necessary and funded 100% by LPA; if LPA agrees to close an existing crossing; or, if LPA provides evidence of financial hardship	5% - Typ. contribution plus 100% future operation and maintenance costs
New or reconstructed Grade Separations including highway underpass vertical clearance modifications and Pedestrian Grade Separations	Up to 60% of eligible costs from estimate submitted with project application	Remainder ⁽²⁾ plus 100% future maintenance costs	Up to 5% - For a new structure to replace a grade crossing when Federal funding is part of the LPA funding package 0% - All other ⁽³⁾
Interconnects where traffic signals currently exist within 500 feet of an existing public grade crossing having AFLS&G	90% - Typ. Contribution for new circuitry, 100% - Modify existing circuitry (or special circumstances)	0% - Initial installation plus 100% future operation and maintenance of the highway traffic signal portion of interconnect circuit; all remaining operating and maintenance costs to Railroad	10% - New circuitry 0% - Modify existing circuitry (or special circumstances)
Highway Approaches and Connecting Roads	0% - Typ. contribution Up to 100% ⁽⁴⁾ if LPA agrees to close an existing crossing or if LPA provides evidence of financial hardship	100% - Typ. contribution Remainder ⁽⁴⁾ if LPA agrees to close an existing crossing or if LPA provides evidence of financial hardship; LPA pays 100% future maintenance	0%
Voluntary Crossing Closures	\$50,000 - \$70,000 payment to LPA for voluntary closure w/no connecting roads, depending on roadway Average Annual Daily Traffic	100% of cost to install temporary barricades plus 100% of future maintenance costs for permanent barricades	100% of cost to install permanent barricades plus 100% of cost to remove crossing surface and warning devices
Crossing Surface Renewals	100% of materials plus 100% of traffic control and asphalt approach paving done by contract	0% - Initial installation 100% - future approach maintenance costs outside of 24 inches from outermost rails	100% of labor for installation plus 100% of future maintenance costs within 24 inches from outermost rails

Notes:

- (1) Typically, GCPF contributions are not to exceed a specified sum, with another party being apportioned any remaining costs over and above the estimated cost
- (2) LPA portion may be funded with Surface Transportation Program (STP) Bridge, Township Bridge Program (TBP) and/or other federal, state, or local funds. GCPF assistance is limited to 60% of eligible costs; maximum GCPF assistance is \$12 Million.
- (3) Unless otherwise agreed by Railroad or assigned by ICC Administrative Law Judge upon formal hearing and entry of ICC Order
- (4) Typically, the GCPF contribution for approach roadway work at a crossing is recommended to be no more than the estimated cost to install automatic flashing light signals and gates at the crossing and the LPA is responsible for the remainder. See "Guidelines and Case Studies for Roadway Approach Rehabilitation Using GCPF" beginning on Page 12 of this booklet for guidance on preparation of approach roadway designs utilizing GCPF assistance.

Additional Information Regarding the GCPF

Further information concerning the administration and distribution of the GCPF, as well as formatting examples for assistance in the preparation of a petition, may be obtained from the Illinois Commerce Commission by calling (217) 782-7660. IDOT's Bureau of Local Roads and Streets may be reached at (217) 782-3805, or by calling the IDOT Regional Engineer of Local Roads and Streets at any of the offices listed below

Please consult the IDOT website at www.idot.illinois.gov to determine which district office serves your county.

District 1

201 W. Center Court
Schaumburg, IL 60196
Phone (708) 705-4201

District 2

819 Depot Avenue
Dixon, IL 61021
Phone (815) 284-5380

District 3

700 E. Norris Drive
Ottawa, IL 61350
Phone (815) 434-8402

District 4

401 Main Street
Peoria, IL 61602
Phone (309) 671-3690

District 5

13473 Illinois Highway 133
P.O. Box 610
Paris, IL 61944
Phone (217) 466-7252

District 6

126 E. Ash Street
Springfield, IL 62704
Phone (217) 782-4690

District 7

400 W. Wabash
Effingham, IL 62401
Phone (217) 342-8321

District 8

1102 Eastport Plaza Drive
Collinsville, IL 62234
Phone (618) 346-3330

District 9

State Transportation Building
P.O. Box 100
Carbondale, IL 62903
Phone (618) 351-5260

Guidelines for Roadway Approach Rehabilitation Using GCPF

Railroads are allowed to make [track adjustments](#) that may incrementally raise the elevation of the tracks and, consequently, cause increases to the approach roadway grades in the vicinity of a grade crossing over time. In some instances, such locations may now display “humped” crossing conditions where long wheelbase vehicles or trailers with low ground clearance can potentially scrape or become “hung up” (i.e., high centered) on the tracks when attempting to traverse the crossing. Steeper than desired approach grades may also create a condition for wheel spin to occur upon vehicle acceleration from a stop in wet or icy conditions. Finally, motorist visibility can also be affected by steeper than desired approach grades, as Stopping and Clearing Sight Distances (Appendix 3) are based on the assumption of flat or nearly flat approach grades.

Humped crossing conditions are typically encountered on low volume (<400 AADT) rural local roads. Roads with higher AADT and functional classifications may also display humped crossing conditions, but the following guidelines and case studies will focus on low volume rural local roads where the conditions are most commonly encountered.

Signing and pavement markings shall follow the [Illinois Supplement to the Manual of Uniform Traffic Control Devices](#) (IL MUTCD), which adopts the federal [MUTCD](#) with potential revisions unique to Illinois. Chapter 8 of the IL MUTCD and the federal MUTCD recommends the placement of the advance warning sign (W10-5 and W10-5P) to alert drivers of the humped crossing condition (Figure 1). However, the only “fix” for humped crossing conditions is for the LPA to rehabilitate the roadway approach grades.



ADVANCE WARNING SIGNS FOR HUMPED CROSSINGS

Figure 1

When highway-rail grade crossing approach rehabilitation is recommended as a public safety improvement to bring the crossing roadway approaches into conformance with the minimum grade requirements of [92 Ill. Adm. Code 1535.204](#) and the LPA needs GCPF assistance to accomplish the approach rehabilitation due to documented financial hardship, the minimum IDOT Motor Fuel Tax roadway design standards from the [IDOT Bureau of Local Roads and Streets Manual](#) (*BLRS Manual*) should be met, as the GCPF is an MFT based funding source. Because there are many applicable requirements at various locations within the *BLRS Manual*, the following guidelines and case studies are intended to help LPAs and designers to prepare appropriate and cost-effective approach roadway designs for low volume rural local roads.

In order to design an effective treatment, it is important to understand the roadway features that are desired for highway-rail crossing safety. A highway-rail grade crossing is simply an at-grade intersection of a highway with a railroad. As such, similar engineering features to a typical intersection of two highways are desirable.

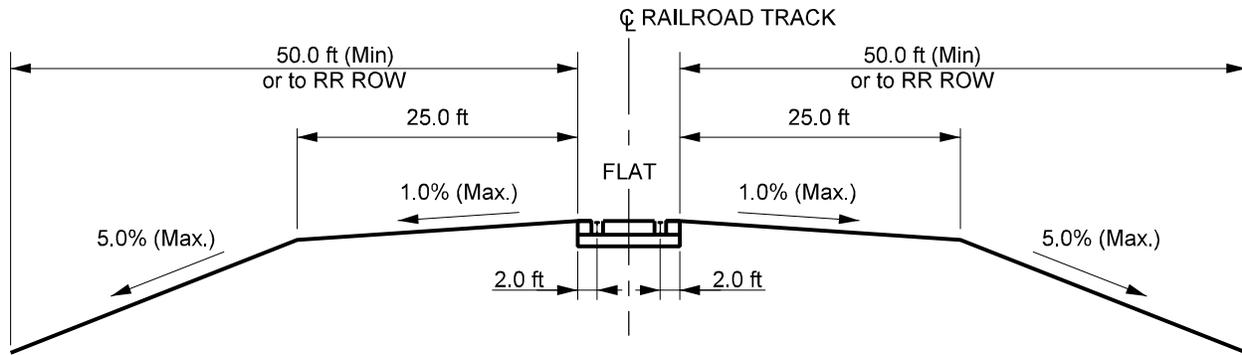
Storage Platform

For an intersection of two highways, [Chapter 34](#), Section 34-1.02(a) of the *BLRS Manual* recommends: “At a minimum, provide the storage platform gradient on the side road for a distance of 30 ft to 50 ft (9 m to 15 m) beyond the edge of the mainline travel way or to the ditch line of an arterial highway,” and “intersection gradients should be as flat as practical but not be greater than 5.0%.” The minimum grade requirements of [92 Ill. Adm. Code 1535.204](#) similarly describe a desired storage platform (Figure 2) for highway-rail grade crossings:

“Unless the Commission otherwise specifically orders, the grade line of highway approaches to grade crossings hereafter established or substantially reconstructed shall be as follows: From the outer rail of the outermost track coincident with a tangent to the tops of the rails for about 24 inches, thence for a distance of 25 feet ascending or descending at a grade which shall not deviate more than 1% from said tangent, thence to the right-of-way line (and as far beyond as the Commission's control may extend in any case) at a grade not to exceed 5%. Where super-elevated track or tracks make strict compliance with this Section impractical the grade of approaches shall be constructed so as to provide the best vertical alignment under the circumstances with due regard to surface regularity.”

In many instances involving low volume rural local roads, the railroad right-of-way lines are located approximately 50 feet on each side of the track centerline, so the desired 30 to 50 foot storage platform with grades no greater than 5% is achieved by simply meeting the requirements of [92 Ill. Adm. Code 1535.204](#) up to, but not beyond, the railroad right-of-way lines. However, in many other instances involving low volume rural local roads, the railroad's right-of-way lines may be located 33 feet or less on each side of the track centerline, so designing an increase in the grades to a grade of more than 5% beginning at the railroad's right-of-way line and beyond may not provide the desired 30 to 50 foot storage platform. Further, some locations may currently or formerly have multiple tracks such that the railroad's right-of-way lines may not be located the same distance on each side of the track centerline.

In light of the many variables that affect where a railroad's right-of-way lines may be located, for safety and simplicity a “design minimum” storage platform length of 50 feet, beginning 24 inches outside of the outermost rails is recommended, whether or not those distance extends beyond the railroad's actual right-of-way lines. If the railroad right-of-way lines are located farther than 50 feet beyond a point 24 inches outside of the outermost rail on one or both sides of the crossing, the storage platform should extend to the actual railroad right-of-way lines if conditions allow.



DESIRED STORAGE PLATFORMS

Figure 2

In instances of severely restricted roadway right-of-way, extremely wide railroad right-of-way (>75 feet on one or both sides of the track centerline), or where nearby intersections or drainage structures will be adversely impacted at significant cost and/or delay to the project, the ICC Rail Safety Section may consider recommending a variance from the minimum grade requirements of 92 Ill. Adm. Code 1535.204 to allow grades greater than 5% within the railroad right-of-way if a storage platform with grades no greater than 5% for a distance of 50 feet, beginning 24 inches outside of the outermost rails, is provided on both sides. In extreme circumstances where any improvements to one or both crossing approaches are determined to be cost prohibitive, the ICC Rail Safety Section may recommend a full waiver of the requirements of 92 Ill. Adm. Code 1535.204 for one or both crossing approaches to allow retention of the existing grades (a common example is the nearby intersection of a state highway located within 100 feet of a railroad and having a significant elevation differential between the track and the state highway).

If help is needed in determining where the railroad right-of-way lines are located for a specific crossing, contact the ICC Rail Safety Section at (217) 782-7660 and a staff member can assist in obtaining confirmation from the railroad.

Design Speed

Section [625 ILCS 5/11-1201\(a\)](#) of the Illinois Rules of the Road states in part:

“Whenever any person driving a vehicle approaches a railroad grade crossing where the driver is not always required to stop, the person must exercise due care and caution as the existence of a railroad track across a highway is a warning of danger...”

This requirement of Illinois law applies at highway-rail grade crossings, whether equipped with automatic warning devices or with Crossbuck/YIELD signs only. Some vehicles, including school buses and hazardous materials transport vehicles, are required to stop at all highway-rail grade crossings (unless marked with “EXEMPT” signs), even if the crossing is equipped with automatic warning devices. Therefore, the danger referenced in the law is not only associated with the approach of trains, but also the possible presence of stopped vehicles carrying hazardous materials or school children.

While the Illinois statutory speed limit on low volume rural local roads without posted speed limits is 55 miles per hour (mph), it is appropriate to design the crossing approach improvements on such facilities for a design speed less than 55 mph. Figure 33-3B and the associated footnotes contained in [Chapter 33](#) of the *BLRS Manual* allow a reduction of 10 mph from the applicable design speeds listed in the table for rural local roads having less than 400 AADT, or the elimination of a design speed altogether if the roadway is on the district road system (township/road district jurisdiction) and has less than 150 AADT. Based on Figure 33-3B, appropriate design speeds for the design of GCPF assisted approach improvements on low volume rural local roads are as follows:

- Under 150 AADT on township/road district road: no design speed required*
- Under 250 AADT on any rural local road: 20 mph design speed*
- 250-400 AADT on any rural local road (rolling terrain): 20 mph design speed*
- 250-400 AADT on any rural local road (level terrain): 30 mph design speed*

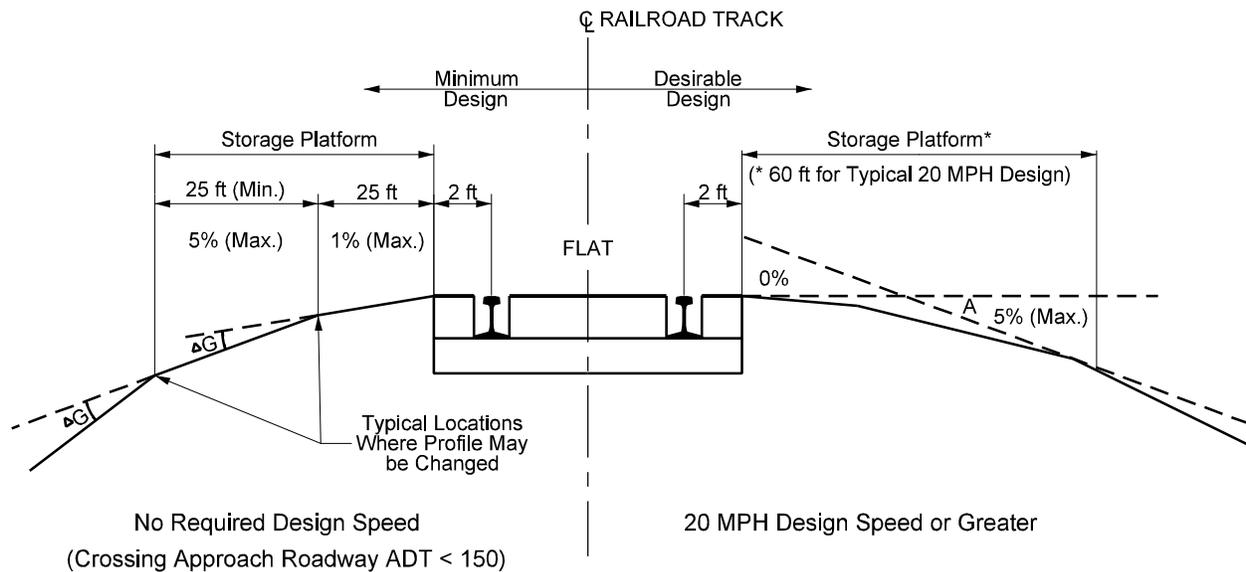
Note: *A design speed of 20 mph may be used for GCPF assistance at the Under 150 AADT level unless severely restricted roadway right-of-way or nearby intersections/drainage structures will be adversely impacted at significant cost and/or delay to the project. With the exception of a 20 mph design speed for the Under 150 AADT level, a LPA funding contribution to cover the excess costs associated with a higher design speed is recommended.

Grade Changes and Vertical Curve Transitions

The design speed as described above should be used in the design of both crest and sag vertical curve transitions at grade change locations in the vertical centerline profile of the roadway. If no design speed is required, a “rollover factor” (instantaneous grade change, ΔG from Figures 34-1D and 34-1E in [Chapter 34](#) of the *BLRS Manual*) having an absolute value of 5% should not be exceeded, and a minimum tangent length of 25 feet should be used. A rollover factor maximum of 5% is a conservative value consistent with *IDOT BLRS Manual* allowances for “new construction” of a rural low volume roadway intersecting a major roadway having greater than 400 AADT. If the “major roadway” from Figure 34-1E is substituted with a railroad track, with some additional modifications the figure becomes adaptable to grade crossings (Figure 3).

When the designer opts for a no design speed vertical profile, the designer should consider the potential frequency of low-boy vehicles and school buses in the selection of rollover factors at grade breaks as profiles become steeper. Where low-boy vehicle or school bus traffic generators are located near the crossing, and a 20 mph design speed cannot be reasonably attained, rollover factors less than 4% are recommended inside and outside of the storage platform. This will provide still more leeway to avoid a recurrence of humped conditions that may arise from future track adjustments.

Figures 30-2A and 30-2D in [Chapter 30](#) of the *BLRS Manual* apply to the design of crest and sag vertical curve transitions, respectively, at locations where a design speed is required. A minimum curve length of 60 feet for a 20 mph design speed should be used, or a curve length equal to K (rate of vertical curvature) \times A (absolute value of the entering grade minus exiting grade, the same calculation as ΔG), whichever is longer. Because the track is higher than the surrounding terrain at humped crossings, crest vertical curve transitions are typically called for within the railroad right-of-way, and sag vertical curve transitions are typically called for when transitioning back to the existing roadway profile off of the railroad right-of-way.



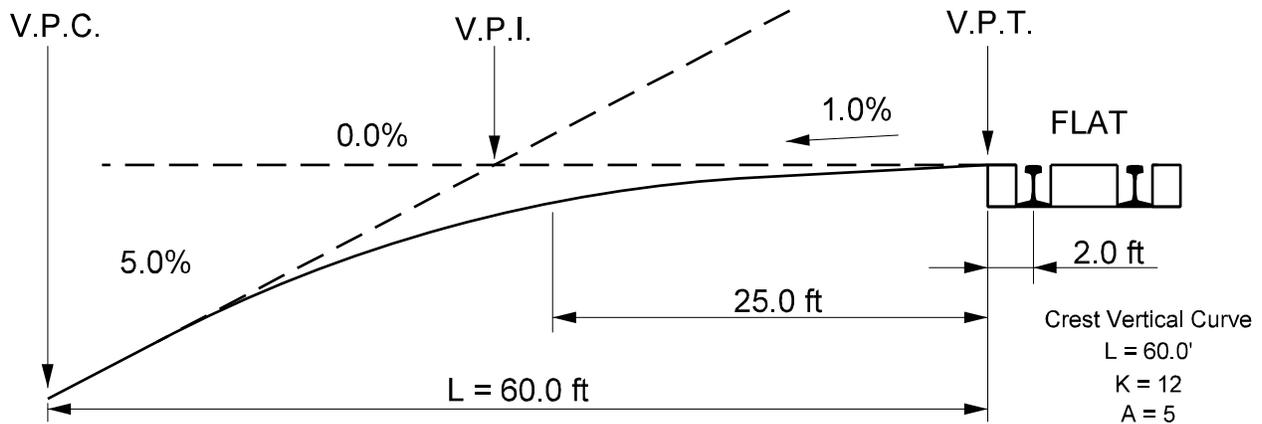
Adaptation of BLRS Manual Figure 34-1E

Figure 3

Crest Vertical Curves within the Storage Platform

When a 0% grade, tangent and flush with the top of the rails (both rails should be at the same elevation when the track is not superelevated for a railroad curve) intersects with a 5% maximum allowable downhill grade within the storage platform, the K-value of 7 from Figure 30-2A of the [BLRS Manual](#) for a 20 mph design speed will result in a vertical curve length of 35 feet ($K=7$, $A=5$, $K \times A = 35$), which is less than the minimum curve length of 60 feet. Therefore, for a 20 mph design speed, a minimum K-value of 12 should be used for crest vertical curves within the storage platform, such that $K \times A$ equals 60 feet (Figure 4).

A 0% tangent grade flush with the top of the rails is used for the vertical curve transitions within the storage platform, rather than a tangent grade deviating from the top of rail plane by a maximum of 1%, as allowed when no vertical curve transition is required in the absence of a design speed requirement. Because a 0% grade near the track is undesirable for both roadway and railroad drainage considerations and may result in ponding conditions, a construction field adjustment is recommended to truncate the vertical curve for the first 25 feet, beginning 24 inches away from the outermost rails, to slope away from the track at a constant grade of 1%, as shown in Figure 4. The resulting instantaneous grade change ΔG at the point where the vertical curve is truncated 27 feet away from the rail will be approximately 1.4% when $K = 12$. This is indiscernible by most vehicle occupants and well within the recommended maximum rollover factor of 5%.



Distance (ft.) from Outermost Rail	Roadway Centerline Elevation (ft.) Below Top of Rail		Slope (%)	Grade Change (ΔG)
	Design	Field Adjusted		
2.0	0.00	0.00	0.0%	1.0%
7.0	0.01	0.05	1.0%	
12.0	0.04	0.10	1.0%	0.0%
17.0	0.09	0.15	1.0%	
22.0	0.17	0.20	1.0%	
27.0	0.26	0.25	1.0%	1.4%
32.0	0.37	0.37	2.4%	

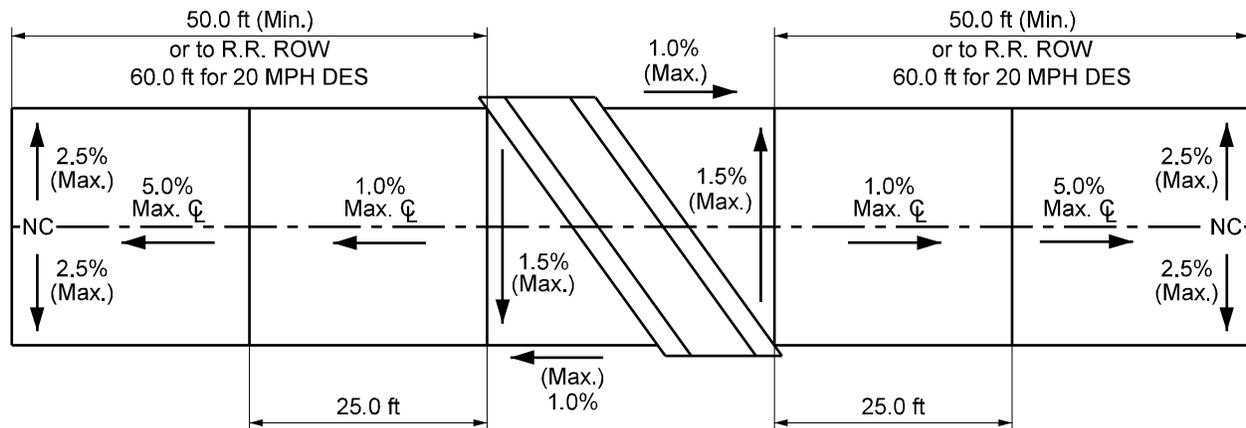
**Desired Crest Vertical Curve Transition within Storage Platform
20 MPH Design Speed Illustration**

Figure 4

In addition to improved drainage near the track, the field adjustment should simplify construction staking and allow the roadway official or construction contractor constructing the improvement to shorten the amount of time spent operating heavy equipment within 25 feet of the track. Railroads typically require a railroad flagger(s) to be present at all times when construction is occurring within 25 feet of the track, which is done for the safety of the construction personnel and the safety of the general public by diminishing the possibility of a collision between a train and heavy construction equipment, which could cause a train derailment to occur.

Special Considerations for Skewed Crossing Angle Locations

Historically, rural roadway routes in Illinois were typically laid out in a regular grid system of north-south or east-west directional roads, while railroad routes were typically laid out to minimize the distance and railroad grades between successive destinations along the railroad. Consequently, it is common for a roadway to cross a railroad at a “skewed” angle that is greater or less than 90 degrees. Because the crossing angle is rarely precisely 90 degrees, for practical purposes crossing angles ranging between 60 and 120 degrees are considered to be “nearly perpendicular” for the purpose of designing GCPF assisted improvements. For a crossing angle less than 60 degrees or greater than 120 degrees, it is recommended that the storage platform, and the beginning locations of crest vertical curves within the storage platform (if a design speed is applicable), should be adjusted according to the following figure, if conditions will allow:



Desired Storage Platform Illustration for Skewed Crossings

Figure 5

Sag Vertical Curve Transitions to Match the Existing Roadway Grade

The requirements for Sag Vertical Curves in [Chapter 30](#), Section 30-2.02 of the *BLRS Manual* apply to the design of sag vertical curve transitions, when a design speed is required.

Maximum Grade Beyond the Storage Platform

The “Maximum Grade” from [Chapter 32](#), Figure 32-3A of the *BLRS Manual* applies to the design of the centerline roadway profile beyond the storage platform. The selection of the maximum grade for each side of the track will have a great influence on the overall length and cost of the project. Maximum grades for each side of the track that equal the 5% maximum grade within the storage platform are desirable if surrounding conditions and available roadway right-of-way will allow. This is typically attainable when the track elevation is approximately 5 feet or less above the centerline roadway surface elevation measured 100 feet away from the track.

If: 1) the track is greater than 5 feet above that point; 2) severely restricted roadway right-of-way exists where nearby buildings, residences or field access will be adversely impacted; or 3) nearby intersections or drainage structures will be adversely impacted at significant cost and/or delay to the project, a maximum grade in excess of 5% is allowable for the approach roadway beyond the storage platform. However, the design maximum grades selected should not result in a significant increase to the maximum grades that previously existed on each side of the crossing.

For general purposes, a rough determination of the existing maximum grades on each side of the crossing can be made using the ICC's [Grade Crossing Search](#) application, by entering the crossing AAR/DOT# or the County where the crossing is located. Once the crossing is located, click on the crossing number or map marker to call up the "Grade Crossing Inventory" screen. Among the "Pictures" on the right side of the screen are files displaying a "PDF" icon. Each of these files contains an aerial photo exhibit of the crossing, which also includes roadway centerline elevation measurements taken with the top of the rails being used as the measurement datum. The roadway centerline elevations at distances of 25, 50 and 100 feet from the rails on each side of the track are shown in the "Road Profile" baseline below each aerial photo. The 1:50 scale photo exhibit file contains data taken circa 2000, while the 1:100 scale photo exhibit file contains data taken circa 2010.

The approximate existing maximum grade on each side of the track can be calculated by averaging the slopes determined from both aerial photo exhibits (vertical change divided by horizontal distance) for the area within the first 50 feet on each side of the track, and then averaging the slopes determined from both exhibits in the area 50 to 100 feet from the track on each side of the track. The greater of the two averages for each side of the track, rounded down to the nearest 0.5%, will be the approximate existing maximum grade for that side of the track (Figure 6).

Existing Approach Grades		0-50 Feet	50-100 Feet	Existing Max. Grade
East/North	Circa 2000	9.0%	6.0%	9.0%
	Circa 2010	9.2%	5.6%	
	Average	9.1%	5.8%	
West/South	Circa 2000	6.4%	4.6%	7.0%
	Circa 2010	8.0%	3.8%	
	Average	7.2%	4.2%	

Sample Calculation of Existing Maximum Grades

Figure 6

Under the requirements of [92 Ill. Adm. Code 1535.207a](#), a railroad is allowed to increase the grades approaching a crossing by no more than 2% at any crossing each time they adjust the track through the crossing. Similarly, the design maximum grades for GCPF assisted approach rehabilitation projects should not exceed 2% greater than the existing maximum grades [Design Maximum Grade (%) \leq Existing Maximum Grade (%) + 2.0%]. As a "practical maximum," grades beyond the storage platform should not exceed 10%, given that the maximum recommended ΔG (rollover factor) of 5% will occur when transitioning from the 5% maximum grade within the storage platform to a 10% maximum grade beyond the storage platform. The allowable maximum grade from Figure 32-3A and associated Footnote 3 in the [BLRS Manual](#) should not be exceeded for the applicable design speed in any event.

When the designer opts for a no design speed vertical profile, the designer should consider the potential frequency of low-boy vehicles and school buses in the selection of rollover factors at grade breaks as profiles become steeper. Where low-boy vehicle or school bus traffic generators are located near the crossing, and a 20 mph design speed cannot be reasonably attained, rollover factors less than 4% are recommended inside and outside of the storage platform. This will provide still more leeway to avoid a recurrence of humped conditions that may arise from future track adjustments.

If a maximum grade greater than 10% is desired beyond the storage platform for a GCPF assisted project, the LPA should contact the ICC Rail Safety Section at (217) 782-7660 to discuss the specific project challenges with a staff member, who may schedule a further site specific review of the location with the BLRS and LPA representatives.

Design Roadway Width

Figure 33-3B and the associated Footnote 2c contained in [Chapter 33](#) of the *BLRS Manual* allow the design traveled way width to be 16 feet or the existing traveled way width, whichever is greater. Improved turf or aggregate shoulders 2 feet in width, also from Figure 33-3B are required, yielding a minimum allowable roadway width (traveled way plus shoulders) of 20 feet for low volume rural local roads. The selected roadway width should not exceed the width of the crossing surface, unless the existing crossing surface provides less than 20 feet of usable width, in which case the crossing surface will need to be widened by the railroad. [92 Ill. Adm. Code 1535.203](#) states in part:

“Any crossing hereafter constructed or reconstructed shall conform to the width of the roadway and shall include a reasonable width of usable shoulder, but in no case shall the width be less than 16 feet measured at right angles to the center line of the highway unless the Commission specifically authorizes a lesser width.”

The railroad is required to widen the crossing surface at the railroad's own cost if the existing usable crossing surface is less than the existing roadway width, and the crossing surface as-in-place does not currently meet the minimum requirements of 92 Ill. Adm. Code 1535. However, if the existing crossing surface does currently comply with the minimum requirements, [92 Ill. Adm. Code 1535.207c](#) requires that the crossing surface widening be completed by the railroad ***“at the sole cost and expense of the highway authority.”***

Because most railroad crossing surfaces are constructed in approximately 8 foot segments, surfaces on rural local roads are typically approximately 24 feet in width, measured along the length of the track. Accordingly, GCPF assistance is typically recommended for low volume rural local road crossing approach designs with design roadway widths ranging from 20 to 24 feet (traveled way plus shoulders). If the existing usable crossing surface width is greater than 20 feet but less than 24 feet due to a skewed crossing angle or other site-specific factors, the selected design roadway width should not exceed the existing usable crossing width.

The ICC Railroad Safety Section staff typically recommends that the LPA pay all additional cost associated with a design roadway width that exceeds 24 feet, or otherwise requires a widening of an existing crossing surface that currently accommodates at least 20 feet of usable roadway.

Design Roadway Side Slopes

Figure 33-3B in the *BLRS Manual* allows the design roadway side-slopes to match the existing roadway side-slopes. However, if the existing side slopes are steeper than 1V:3H and existing available roadway right-of-way allows, or can be obtained easily and without disagreement or otherwise causing a significant delay, 1V:3H design side slopes should be used for the design when utilizing GCPF assistance for low volume rural local roads.

The ICC Railroad Safety Section staff typically recommends that the LPA pay all additional costs associated with roadway side slopes that are designed flatter than 1V:3H.

Design Roadway Surface Type

Figure 33-3B in the *BLRS Manual* allows a Bituminous Treated or Aggregate Surface Type for low volume rural local roads. The ICC Railroad Safety Section staff typically recommends that GCPF assistance be used to help pay for the construction of Bituminous Treated Surfaces of the A-1, A-2 or A-3 type, per Section 403 of the [IDOT Standard Specifications and Special Provisions for Road and Bridge Construction](#) (Standard Specifications). Alternatively, an Aggregate Surface Course may be constructed, per Section 402 of the Standard Specifications. An Aggregate Surface Course is not recommended where high speed passenger trains (>79 mph) operate or locations having 50 AADT or more.

If a Hot Mix Asphalt (HMA) Surface Course is desired per Section 406 of the Standard Specifications, the ICC Railroad Safety Section staff typically recommends that the LPA pay all additional costs associated with an HMA Surface Course (compared to an A-3 Surface Treatment).

Stop bar pavement markings should be installed on both sides of the railroad track, per MUTCD requirements, or an A-1 “chip seal” surface treatment should be applied to the HMA surface. It is typically recommended that a LPA pay all additional costs associated with the stop bar pavement markings or chip seal surface treatment when an HMA Surface Course is specified.

Project Limits for GCPF Assistance

In most cases, the ICC Railroad Safety Section recommends that GCPF assistance be used to help pay for improvements within the “touchdown-to-touchdown” project limits, measured from end-to-end of the sag vertical curve transitions returning to the existing roadway surface on both sides of the railroad. However, the ICC Railroad Safety Section typically recommends that a LPA pay all additional costs associated with a greater project length due to the selection of a design speed greater than the minimum or a design maximum grade significantly less than the existing maximum grade. The touchdown points determined for the minimum design speed and a reasonable maximum grade, as previously described, should be used for determining the additional project length and associated additional project costs.

Preparation and Submission of Cost Estimates and Plans

Because reimbursement for Preliminary Engineering costs to design GCPF assisted approach rehabilitation projects does not begin until an ICC Stipulated Agreement is executed and approved by ICC Order, most ICC Stipulated Agreements are initiated using “order of magnitude preliminary cost estimates”. The Stipulated Agreement will typically specify that the LPA submit for approval detailed roadway plans and cost estimates, within 90 days from the date of the Order, to the IDOT District BLRS serving the County in which the project is located.

Because the ICC Rail Safety Section must make certain recommendations with respect to division of costs and allowable GCPF assistance for the project, as described previously, the LPA’s engineer should contact the Rail Safety Section at (217) 782-7660 during the 90 day preparation period if any of the previous recommendations that may affect the allowable amount of GCPF assistance are desired. Preliminary profiles and cross-sections should be provided to the ICC Rail Safety Section for comment as soon as possible in the 90 day preparation period and prior to submission of “pre-final plans” to the IDOT District BLRS.

Preliminary cost estimates submitted to the ICC for the preparation of a Stipulated Agreement should be prepared on form [BLR 11510](#) Rail Safety Section available in the “BLR Forms” area of the IDOT website, and should include estimates for Preliminary Engineering, Construction Engineering, Railroad Flagging/Protective Liability Insurance, Traffic Control and Protection, and the approximate anticipated amounts and costs for Earth/Furnished Excavation, Grading/Shaping, Seeding, and Roadway Surface Type (e.g. Aggregate Surface, Bituminous Surface Treatment, or HMA) and the roughly anticipated Project Length. Items such as Pipe Culvert Extension/Replacement, Right-of-Way Acquisition, Temporary Ditch Checks, etc, may be itemized separately or included in a general project contingency amount up to 20% of the rough preliminary estimate of cost for construction.

Rough approximations for all of these items may be calculated using the recommendations and techniques previously established for projects eligible for GCPF assistance as outlined in this document.

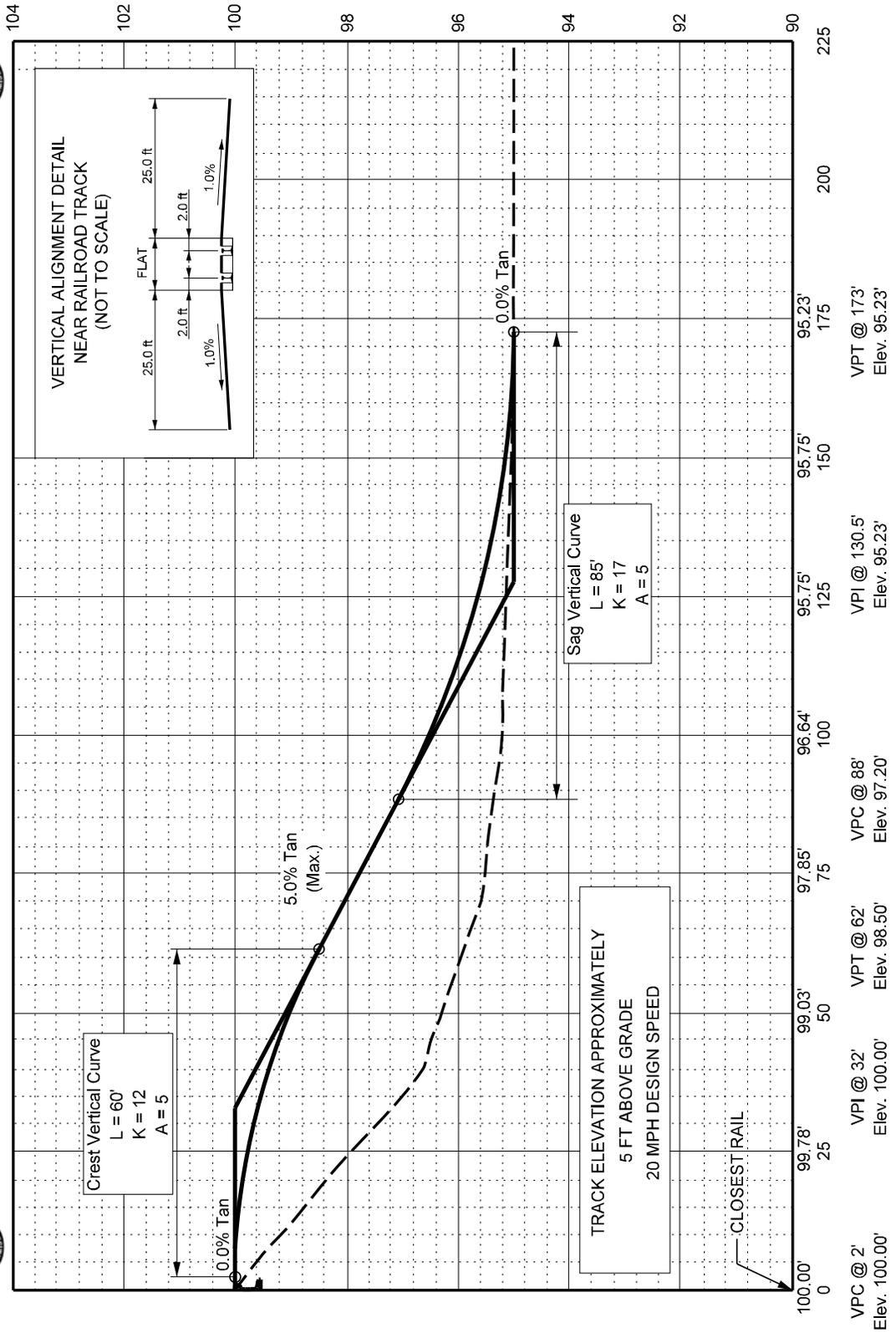
Appendix 1 – Potential Profiles

Further illustrations of the ICC Rail Safety Section's recommendations regarding roadway designs for grade crossing projects on rural local roads receiving GCPF assistance are contained in Appendix 1 of this booklet.

When the designer opts for a no design speed vertical profile, the designer should consider the potential frequency of low-boy vehicles and school buses in the selection of rollover factors at grade breaks as profiles become steeper.

- Figure 1 - Track Elevation Approximately 5 Ft above Grade (20 mph Design Speed)
- Figure 2 - Track Elevation Approximately 5 Ft above Grade (No Required Design Speed)
- Figure 3 - Track Elevation 5 to 10 Ft above Grade (20 mph Design Speed)
- Figure 4 - Track Elevation 5 to 10 Ft above Grade (No Required Design Speed)
- Figure 5 - Track Elevation 10 to 15 Ft above Grade (20 mph Design Speed)
- Figure 6 - Track Elevation 10 to 15 Ft above Grade (No Required Design Speed)
- Figure 7 - Track Elevation 15 to 20 Ft above Grade (20 mph Design Speed)
- Figure 8 - Track Elevation 15 to 20 Ft above Grade (No Required Design Speed)

**RECOMMENDED ROADWAY DESIGN FOR GRADE CROSSING ON
 LOW VOLUME RURAL LOCAL ROADS - ICC RAIL SAFETY SECTION**

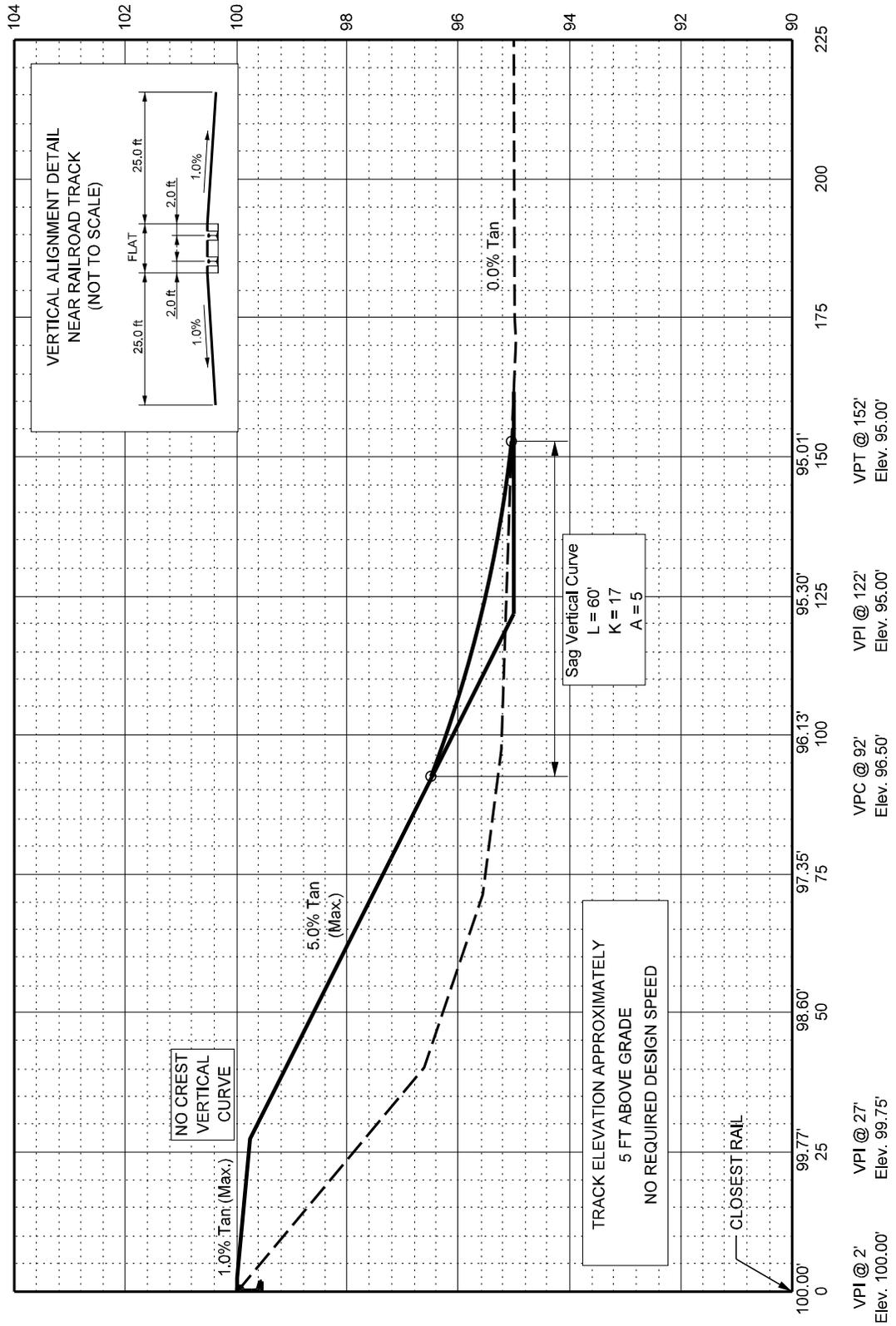


**TRACK ELEVATION APPROXIMATELY 5 FT ABOVE GRADE
 20 MPH DESIGN SPEED**

Figure 1 (Appendix 1)



RECOMMENDED ROADWAY DESIGN FOR GRADE CROSSING ON
LOW VOLUME RURAL LOCAL ROADS - ICC RAIL SAFETY SECTION

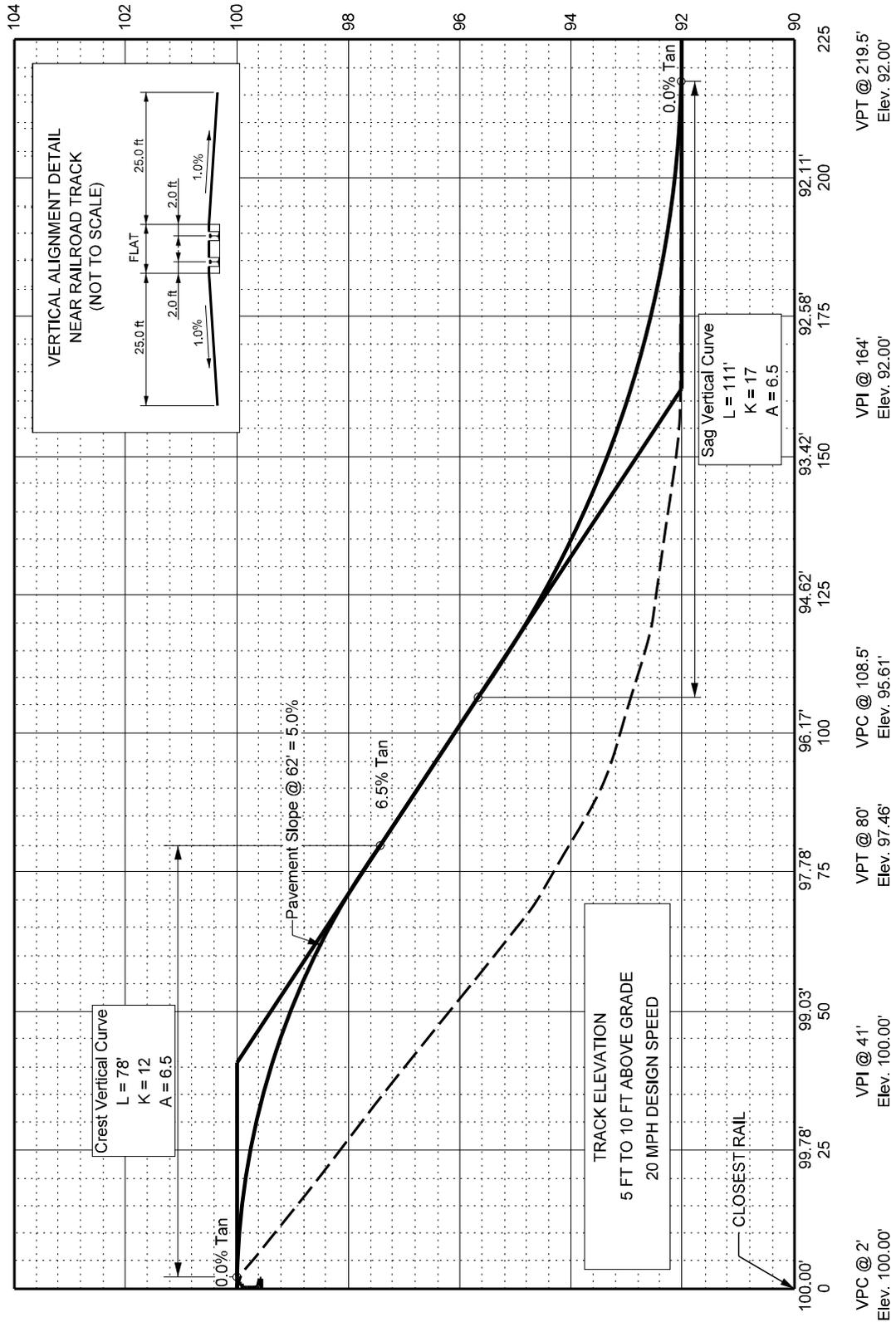


TRACK ELEVATION APPROXIMATELY 5 FT ABOVE GRADE
NO REQUIRED DESIGN SPEED

Figure 2 (Appendix 1)



RECOMMENDED ROADWAY DESIGN FOR GRADE CROSSING ON
LOW VOLUME RURAL LOCAL ROADS - ICC RAIL SAFETY SECTION

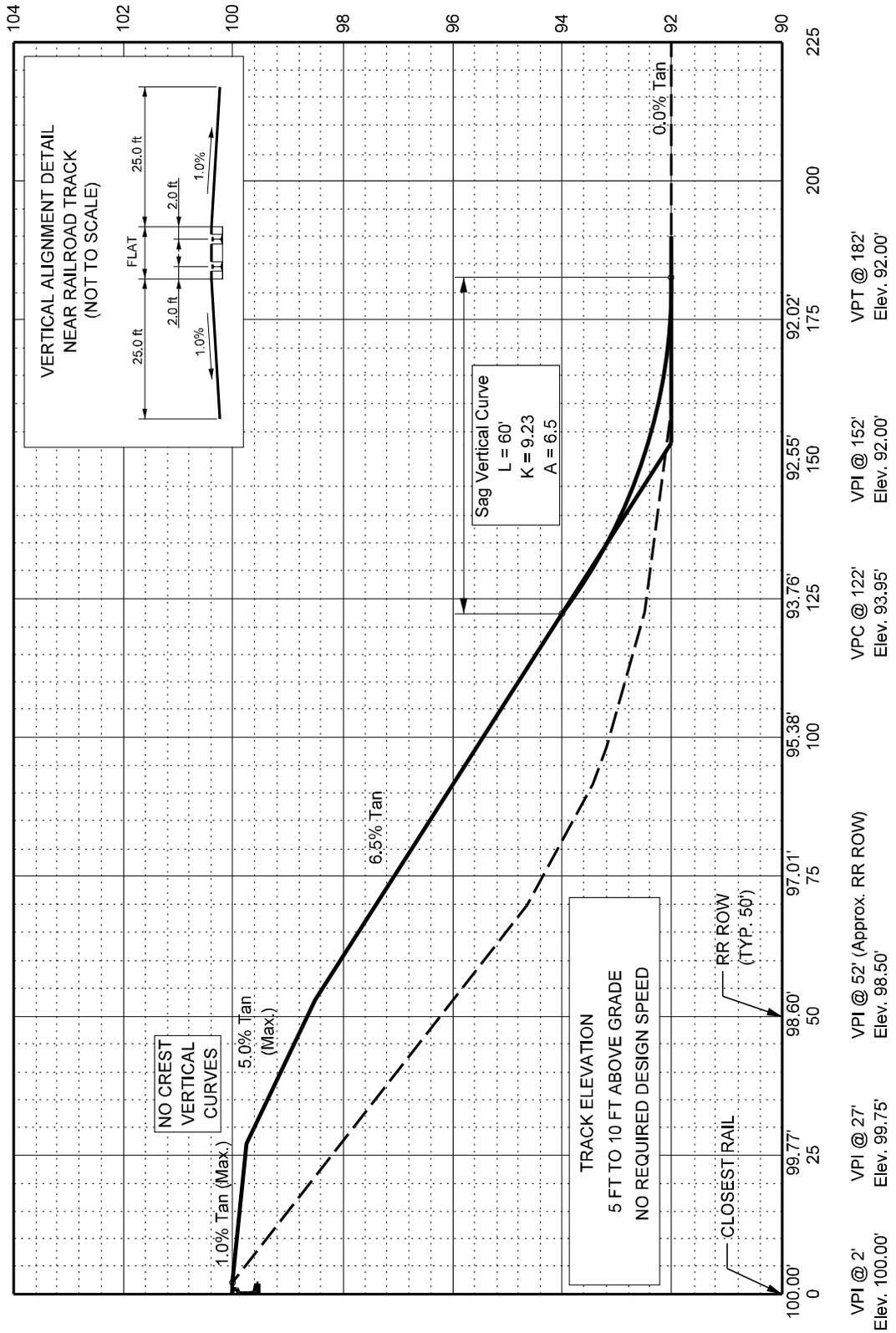


TRACK ELEVATION 5 FT to 10 FT ABOVE GRADE
20 MPH DESIGN SPEED

Figure 3 (Appendix 1)



**RECOMMENDED ROADWAY DESIGN FOR GRADE CROSSING ON
LOW VOLUME RURAL LOCAL ROADS - ICC RAIL SAFETY SECTION**

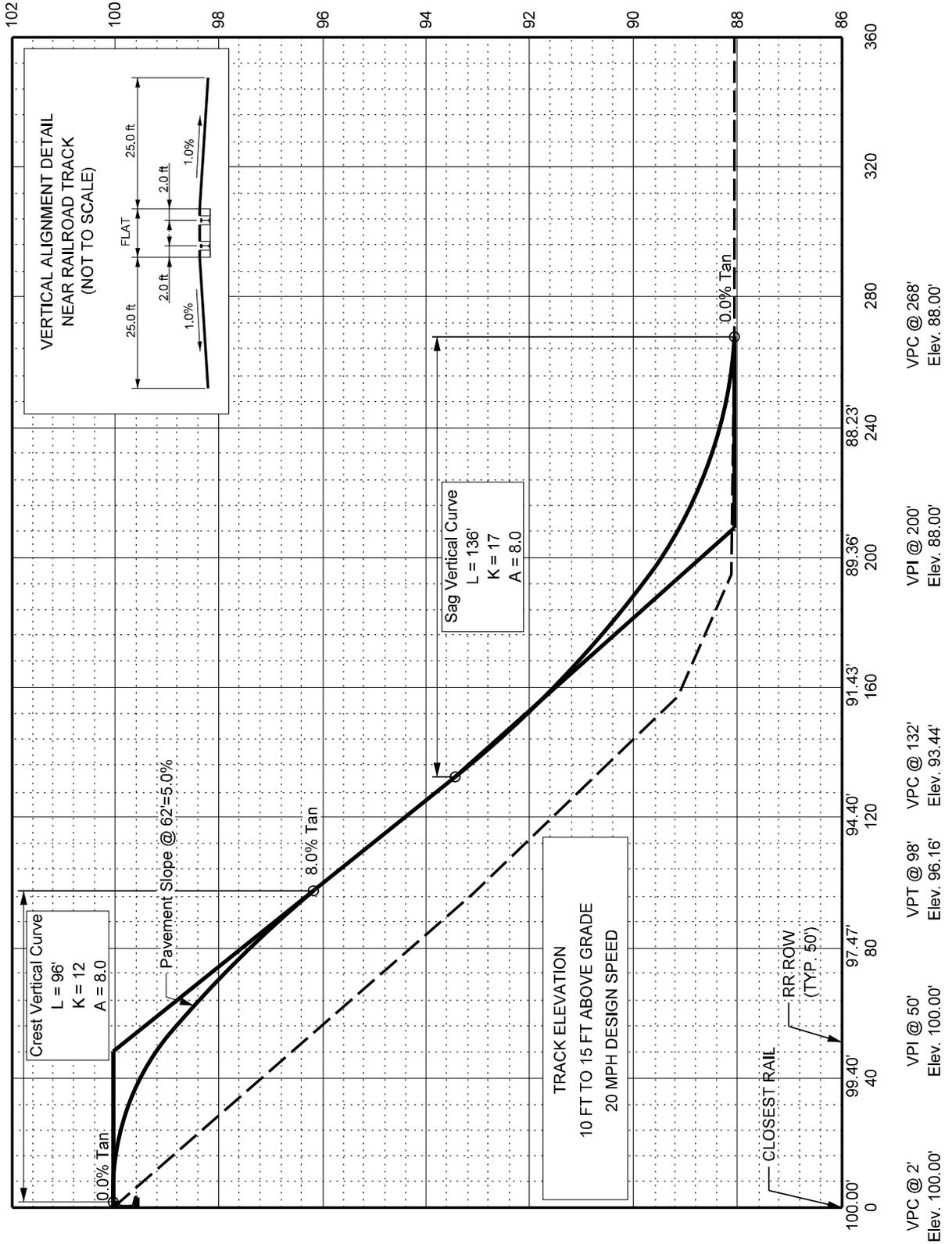


**TRACK ELEVATION 5 FT TO 10 FT ABOVE GRADE
NO RQUIRED DESIGN SPEED**

Figure 4 (Appendix 1)



**RECOMMENDED ROADWAY DESIGN FOR GRADE CROSSING ON
LOW VOLUME RURAL LOCAL ROADS - ICC RAIL SAFETY SECTION**

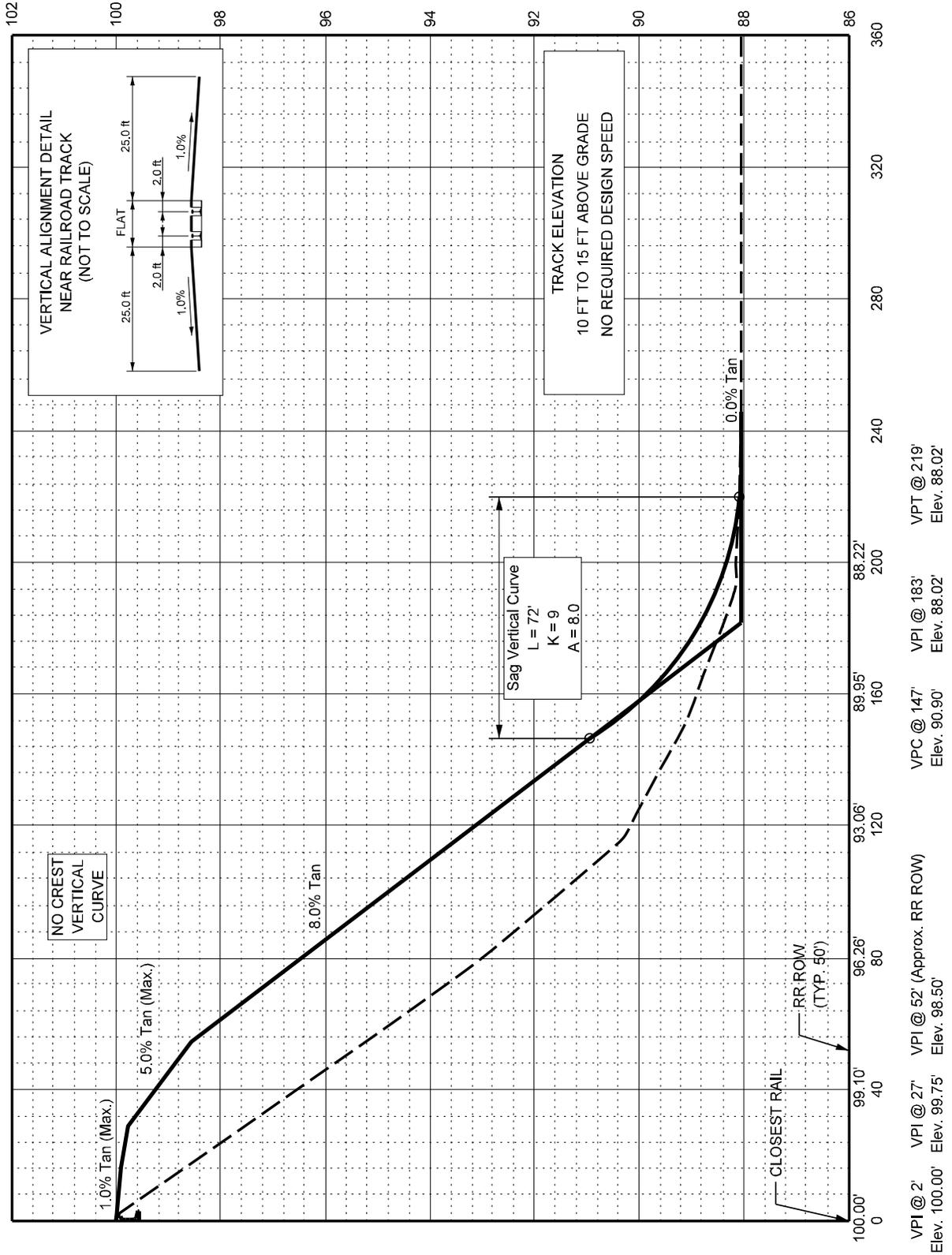


**TRACK ELEVATION 10 FT to 15 FT ABOVE GRADE
20 MPH DESIGN SPEED**

Figure 5 (Appendix 1)



RECOMMENDED ROADWAY DESIGN FOR GRADE CROSSING ON
LOW VOLUME RURAL LOCAL ROADS - ICC RAIL SAFETY SECTION

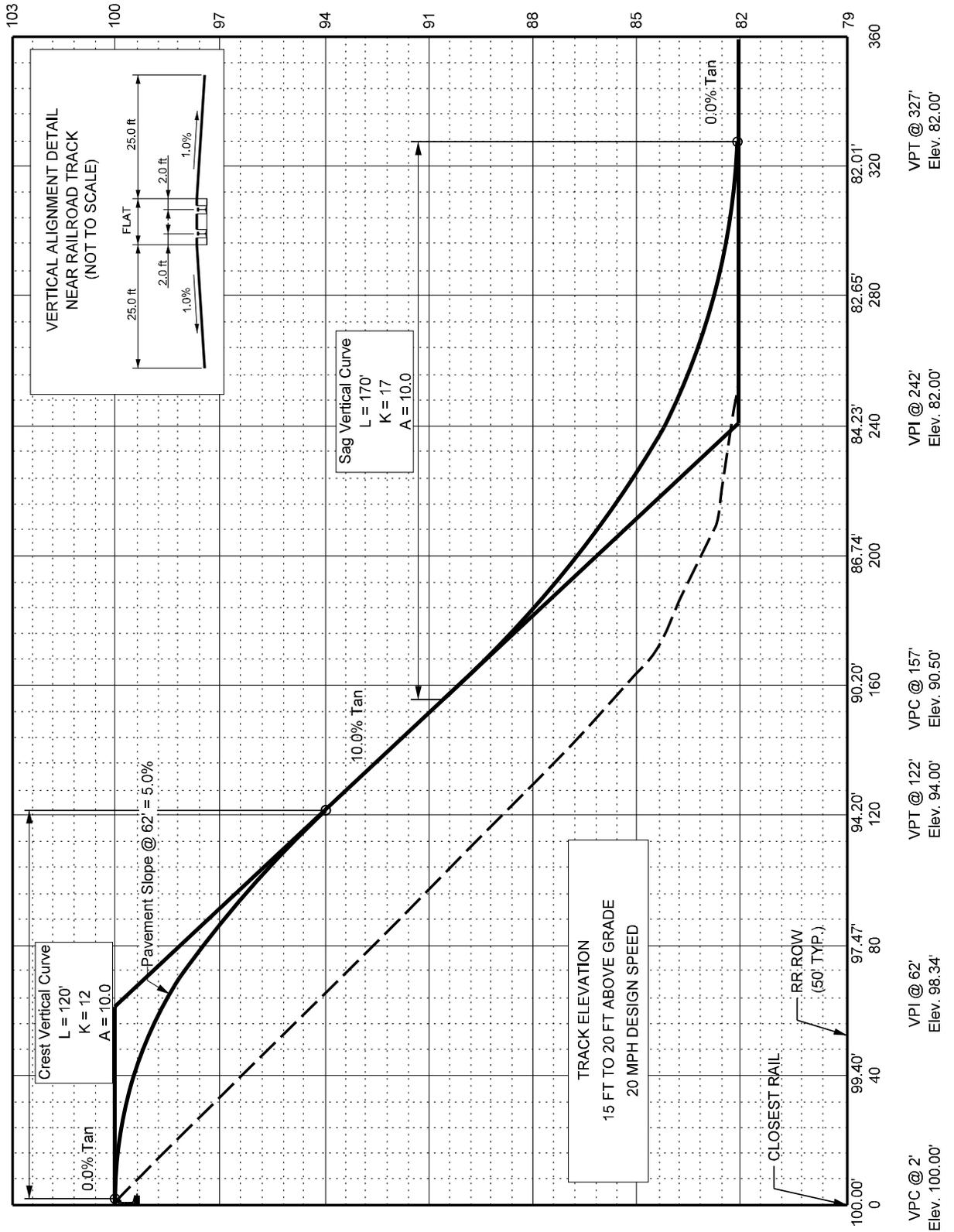


TRACK ELEVATION 10 FT to 15 FT ABOVE GRADE
NO REQUIRED DESIGN SPEED

Figure 6 (Appendix 1)



RECOMMENDED ROADWAY DESIGN FOR GRADE CROSSING ON LOW VOLUME RURAL LOCAL ROADS - ICC RAIL SAFETY SECTION

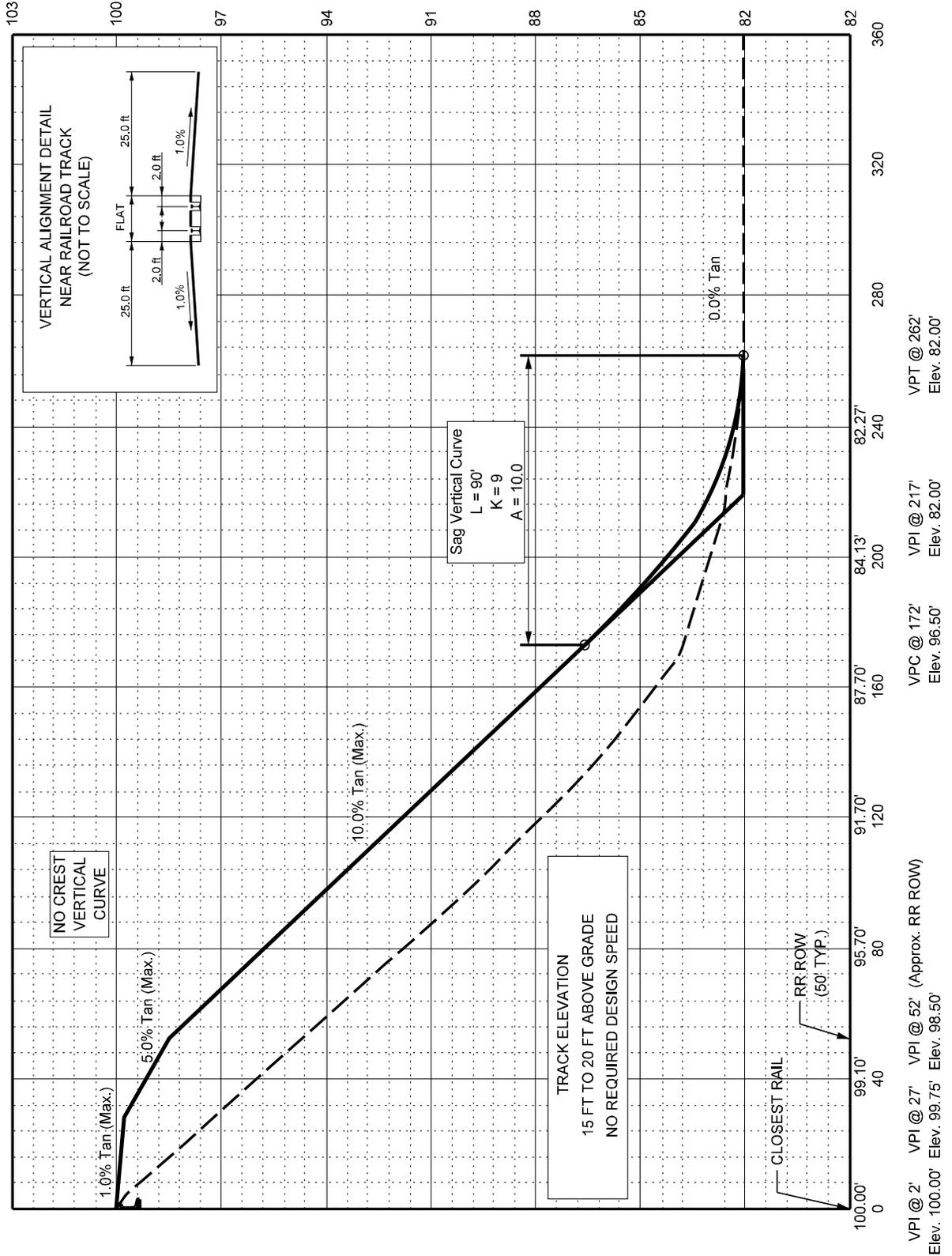


TRACK ELEVATION 15 FT TO 20 FT ABOVE GRADE 20 MPH DESIGN SPEED

Figure 7 (Appendix 1)



RECOMMENDED ROADWAY DESIGN FOR GRADE CROSSING ON LOW VOLUME RURAL LOCAL ROADS - ICC RAIL SAFETY SECTION



TRACK ELEVATION 15 FT to 20 FT ABOVE GRADE
NO REQUIRED DESIGN SPEED

Figure 8 (Appendix 1)

Appendix 2 – Example Cost Savings

Appendix 2 contains examples of three actual projects that received GCPF assistance, which illustrate how a LPA decision to use design criteria resulting in a lengthier than required project can affect a project budget and timeline. In each case, the LPA provided a monetary or labor contribution to reduce or eliminate GCPF assistance for other aspects of the project. Because grade crossing approach rehabilitation projects are identified and constructed in the interest of public safety, avoiding project delay is equally important to reducing project costs. A delay of three years for Land Acquisition and Archeological Research could have been avoided in the third example study illustration.

When the designer opts for a no design speed vertical profile, the designer should consider the potential frequency of low-boy vehicles and school buses in the selection of rollover factors at grade breaks as profiles become steeper.

Example 1:

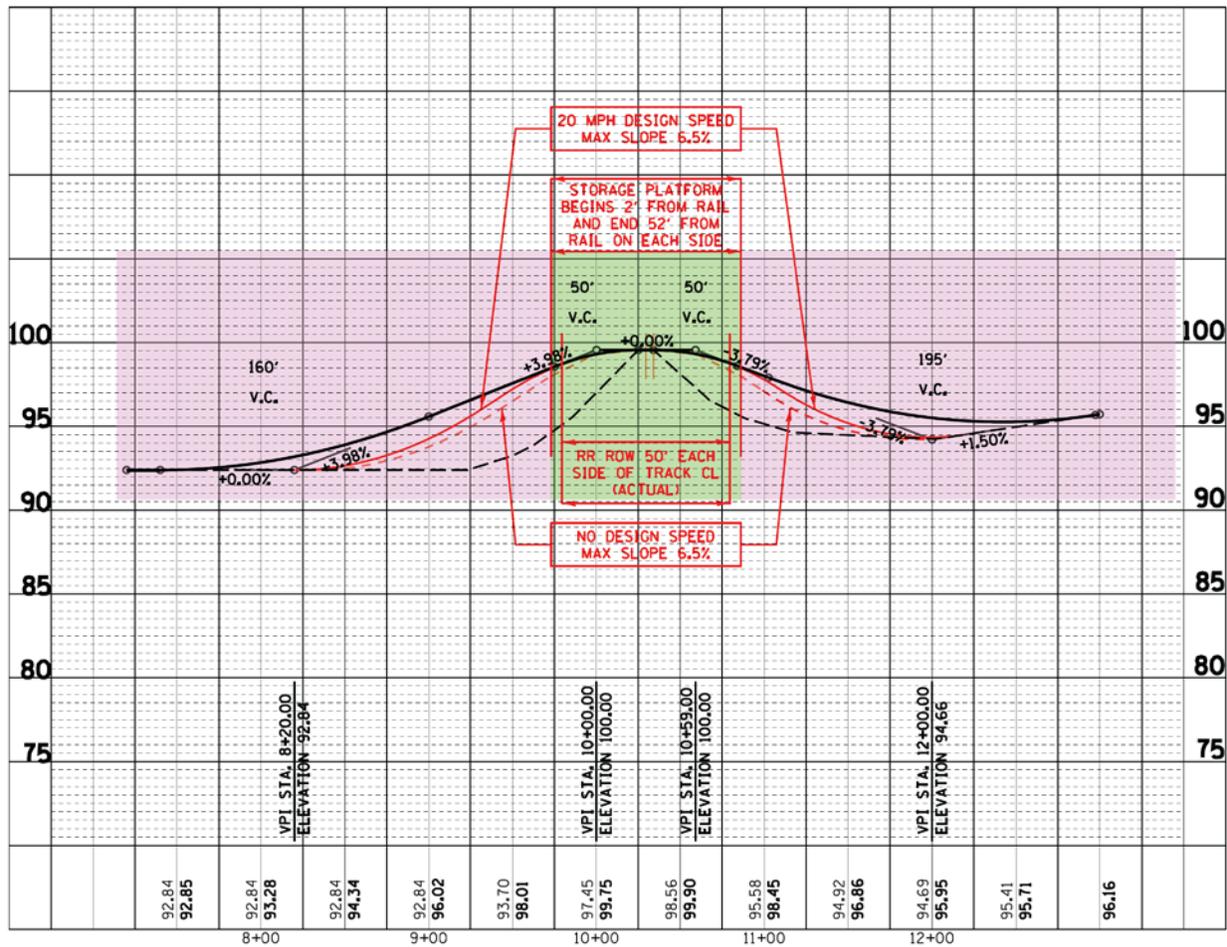
LPA – Township / Road District
 Functional Classification – Local Road
 ADT – 25

IDOT Approved Design = \$34,868
 - 1,301 CY of Fill Required @ \$8.00 / CY
 - 550 Ft of Surface / Road Base @ \$19.00 / Ft

Oil & Chip constructed separately and donated by the County.

ICC Staff Recommendation (20 mph) = \$28,770
 - 895 CY of Fill required @ \$8.00 / CY
 - 400 Ft of Surface / Road Base @ \$19.00 / Ft

ICC Staff Recommendation (No Design Speed) = \$24,890
 - 600 CY of Fill required @ \$8.00 / CY
 - 220 Ft of Surface / Road Base @ \$19.00 / Ft



EXAMPLE 1 – TRACK 7.5 FT ABOVE NATURAL GROUND (Maximum)

Figure 1 (Appendix 2)

Example 2:

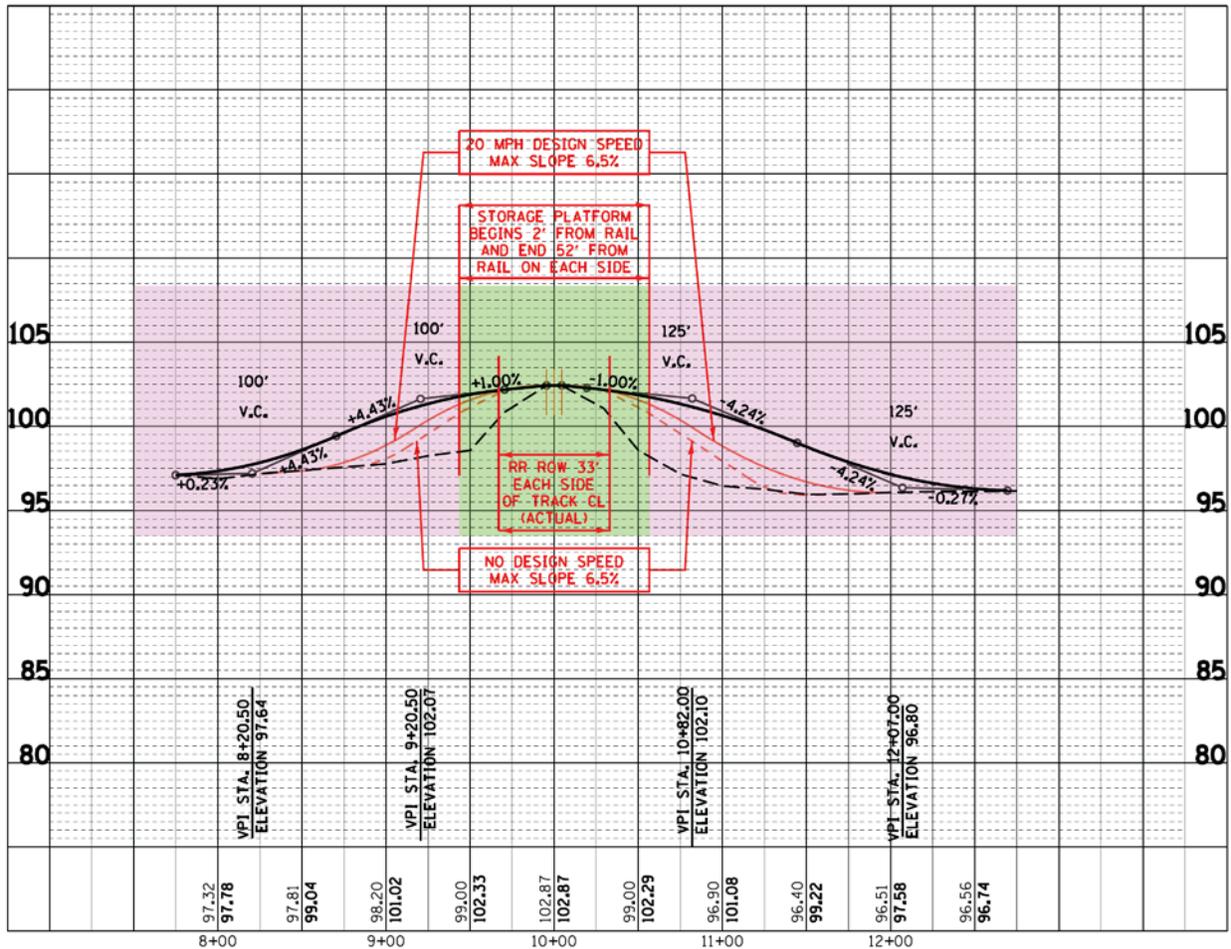
LPA – Township / Road District
 Functional Classification – Local Road
 ADT – 50

IDOT Approved Design = \$26,100
 - 1,200 CY of Fill Required @ \$14.00 / CY
 - 500 Ft of Surface / Road Base @ \$8.00 / Ft

Constructed by Township / Road District forces. Engineering donated by the County

ICC Staff Recommendation (20 mph) = \$17,160
 - 630 CY of Fill required @ \$14.00 / CY
 - 380 Ft of Surface / Road Base @ \$8.00 / Ft

ICC Staff Recommendation (No Design Speed) = \$14,380
 - 460 CY of Fill required @ \$14.00 / CY
 - 330 Ft of Surface / Road Base @ \$8.00 / Ft



EXAMPLE 2 – TRACK 7.0 FT ABOVE NATURAL GROUND (Maximum)

Figure 2 (Appendix 2)

Example 3:

LPA – Township / Road District
 Functional Classification – Local Road
 ADT – 75

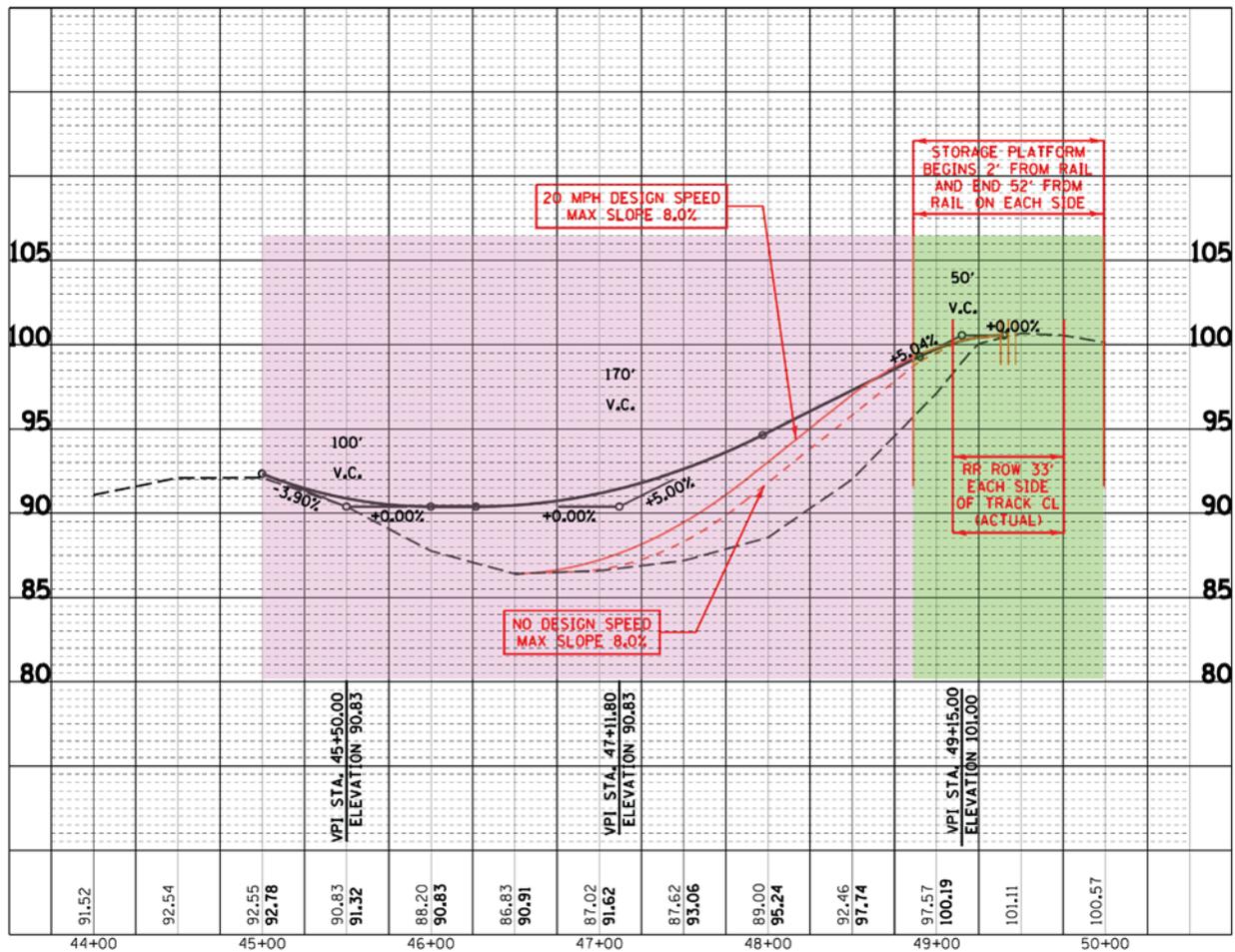
IDOT Approved Design = \$107,871
 - 2,151 CY of Fill Required @ \$13.00 / CY
 - 500 Ft of Surface / Road Base @ \$50.00 / Ft

Constructed by contractor.
 Surface / Road Base include Oil & Chip.

ICC Staff Recommendation (20 mph) = \$84,498
 - 930 CY of Fill required @ \$13.00 / CY
 - 300 Ft of Surface / Road Base @ \$50.00 / Ft

ROW acquisition could have been avoided, along with \$1,200 in cost and three years of delay.

ICC Staff Recommendation (No Design Speed) = \$78,423
 - 655 CY of Fill required @ \$13.00 / CY
 - 250 Ft of Surface / Road Base @ \$50.00 / Ft



EXAMPLE 3 – TRACK 14.0 FT ABOVE NATURAL GROUND (Maximum)

Figure 3 (Appendix 2)

Appendix 3 – Sight Visibility

Appendix 3 is derived from *A Policy on Geometric Design of Highways and Streets* published by AASHTO in 2011.

Examples using Figure 1 (Appendix 3):

Case A: Stopping Sight Visibility

A driver of an automobile approaching a crossing at 30 mph with a train approaching at 50 mph would need a stopping sight distance at 494 ft. down the track. (Figure 2 (Appendix 3))

Case B: Clearing Sight Visibility

A driver of an automobile, stopped 15 ft. from the crossing, with a train approaching at 30 mph would need a clearing sight distance of 721 ft. down the track. (Figure 3 (Appendix 3))

Train Speed (mph)	Case II Departure From Stop	Case I Moving Vehicle						
	0	Vehicle Speed						
		10	20	30	40	50	60	70
		Distance Along Railroad from Crossing, d_T (ft)						
10	240	146	106	99	100	105	111	118
20	480	293	212	198	200	209	222	236
30	721	439	318	297	300	314	333	355
40	961	585	424	396	401	419	444	473
50	1201	732	530	494	501	524	555	591
60	1441	878	636	593	601	628	666	709
70	1681	1024	742	692	701	733	777	828
80	1921	1171	848	791	801	838	888	946
90	2162	1317	954	890	901	943	999	1064
		Distance Along Highway from Crossing, d_H (ft)						
		69	135	220	324	447	589	751

Note:

Required design sight distance for combination of highway and train vehicle speeds; 65-ft truck crossing a single set of tracks at 90°.

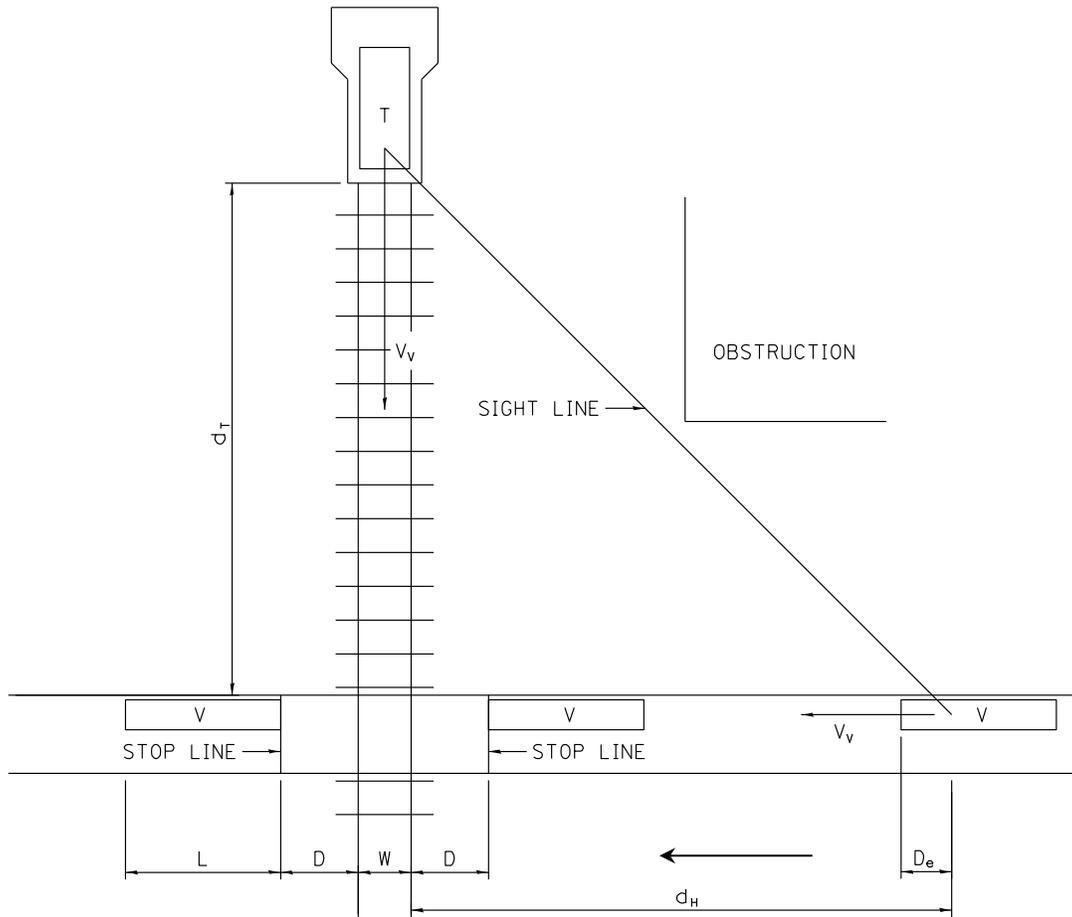
Figure 1 (Appendix 3)

Error! Bookmark not defined. $d_H = 1.47V_v t + \frac{1.075V_v^2}{a} + D + d_e$

$$d_T = \frac{V_T}{V_v} \left(1.47V_v t + \frac{1.075V_v^2}{a} + 2D + L + W \right)$$

- d_H = Sight Distance Along Highway (ft.)
- d_T = Sight Distance Along Railroad Tracks (ft.)
- V_v = Speed of Vehicle (mph)
- V_T = Speed of Train
- t = Perception/Reaction Time (assumed 2.5 Sec.)
- a = Driver Deceleration (assumed 11.2 ft/sec²)
- D = Distance from Stop Line or Front of Vehicle to the Nearest Rail (Assumed 15 ft.)
- d_e = Distance from Driver to Front of Vehicle (Assumed 8 ft.)
- L = Length of Vehicle (Assumed 65 ft.)
- W = Distance between Outer Rails (Single Track = 5 ft.)

- * Adjustments must be made for Skewed Crossings.
- ** Assumed Flat Highway Grades Adjacent To And At Crossings.



Case A – MOVING VEHICLE TO SAFELY CROSS OR STOP AT RAILROAD CROSSING

Figure 2 (Appendix 3)

$$d_T = 1.47V_T \left[\frac{V_G}{a_1} + \frac{L + 2D + W - d_a}{V_G} + J \right]$$

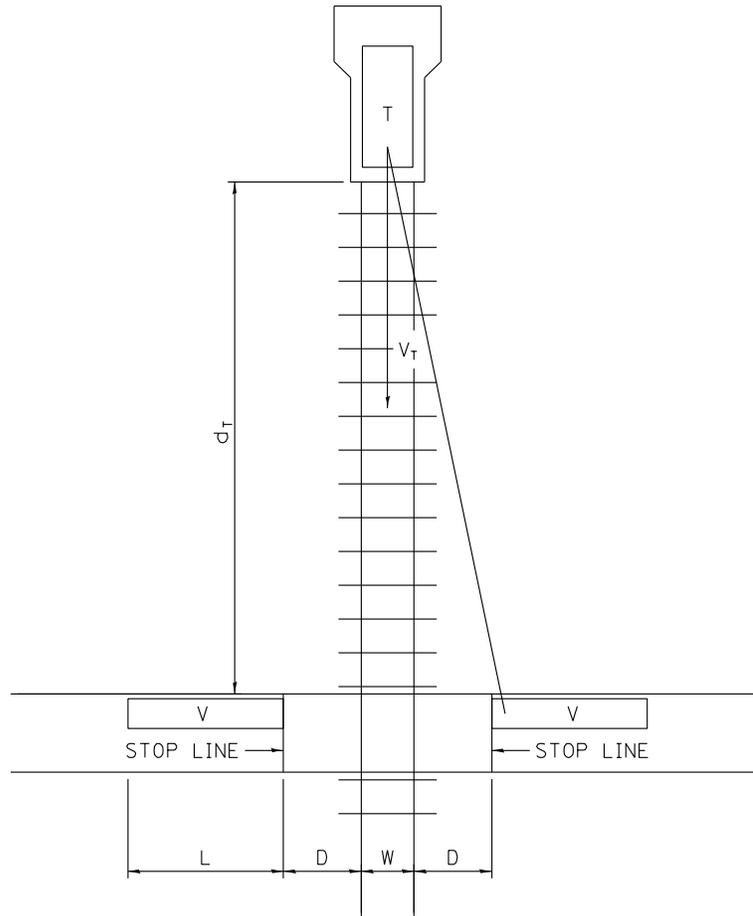
- d_T = Sight distance along railroad tracks to allow a stopped vehicle to depart and safely cross the railroad tracks.
- V_T = Speed of train (mph)
- V_G = Maximum speed of vehicle in first gear (assumed 8.8 ft/sec)

$$d_a = \frac{V_G^2}{2a_1} \quad a_1 = \text{Acceleration of vehicle in first gear assumed } 1.47 \text{ ft/sec}^2$$

, or distance vehicle travels while accelerating to maximum speed in first gear.

- D = Distance from stop line or front of vehicle to the nearest rail (assumed 15 ft)
- W = Distance between outer rails (single track $W = 5$ ft)
- L = Length of vehicle (assumed 65 ft)
- J = Perception/reaction time (assumed 2.0 s)

- * Adjustments must be made for skewed crossings.
- ** Assumed flat highway grades adjacent to and at crossings.



Case B – DEPARTURE OF VEHICLE FROM STOPPED POSITION TO CROSS SINGLE RAILROAD TRACK
Figure 3 (Appendix 3)

Appendix 4 – Sample Petition

Sample Petition for Reconstruction (or Construction*) of Grade Separation

The original is to be submitted to the Illinois Commerce Commission and copies to each of the respondents. A list of designated agents for each railroad company upon which petitions may be served may be obtained from IDOT or the ICC.

** The sample petition is drawn up for an existing structure; it could be applicable to a proposed structure with only a few modifications. Reconstruction projects involving less than \$1 million of estimated expenditures from the GCPF may be handled through the Commission's stipulated agreement procedure.*

STATE OF ILLINOIS

ILLINOIS COMMERCE COMMISSION

CITY OF GALESBURG, Municipal Corporation)
)
)
VS)
)
BURLINGTON NORTHERN SANTA FE RAILWAY COMPANY AND THE ILLINOIS DEPARTMENT OF TRANSPORTATION)
)
Petition for the reconstruction of the Farnham Street Viaduct over the tracks of the Atchison, Topeka and Santa Fe Railway Company, in Galesburg, Knox County, Illinois.)

PETITION

To the Illinois Commerce Commission:

Petitioner, City of Galesburg, respectfully represents to the Commission that:

1. It is an Illinois municipal corporation, with offices at 161 South Cherry Street, Galesburg, Illinois 61401.
2. The Burlington Northern Santa Fe Railway Company, a respondent herein, is a Delaware corporation maintaining offices in Illinois at 80 East Jackson Blvd., Chicago, Illinois 60604.
3. The Illinois Department of Transportation, a respondent herein, has offices at 2300 South Dirksen Parkway, Springfield, Illinois 62764.
4. A main line of the respondent railway extends in a generally east-and-west direction through the City of Galesburg.

5. A vehicular bridge extends over the main line of respondent railway at Farnham Street, which is a main north and south street located at the east side of Galesburg and is part of the municipal street system.
6. Said bridge was constructed about 1909 with steel supports and wooden decking. Vehicular use of the structure has increased substantially in volume since its original construction, and the bridge is no longer capable of carrying the volume and weight of vehicular traffic presently over it.
7. The Farnham Street bridge carries a substantial amount of statewide traffic and were it not for the load limits presently in effect, even greater use would be made statewide of it.
8. A study made for Petitioner by the City of Galesburg's engineering division estimates the cost of reconstruction with a two (2) lane concrete and steel structure with walkways, including approaches, to be \$3,500,000.00.
9. Petitioner is willing to contribute towards the expense of reconstructing the Farnham Street bridge, but seeks a 60 percent contribution for eligible project costs from the Grade Crossing Protection Fund on behalf of the statewide public.

Wherefore, Petitioner prays that the Illinois Commerce Commission conduct a hearing on this petition, and after the hearing, provide by Order the reconstruction of the Farnham Street bridge, prescribing the manner in which the costs shall be divided among the parties, and directing that the Illinois Department of Transportation pay 60 percent of eligible project costs from the Grade Crossing Protection Fund.

PROOF OF SERVICE

STATE OF ILLINOIS)
)
COUNTY OF KNOX)

I, _____, on oath state that on behalf of the petitioner I served the foregoing Petition upon both of the respondents made parties to this proceeding, by enclosing copies of the Petition in envelopes plainly addressed to those parties at the addresses shown for them in the Petition, with postage fully prepaid, and depositing the envelopes in the United States Post Office at Galesburg, Illinois on _____, 20 ____.

Respectfully,

CITY OF GALESBURG

By _____
(Print Title Here)

Appendix 5 – Acronyms

AADT	Adjusted Average Daily Traffic
AFLS	Automatic Flashing Light Signals
AFLS&G	Automatic Flashing Light Signals and Gates
ALJ	Administrative Law Judge
BLRS	Bureau of Local Roads and Streets
CSIP	Crossing Safety Improvement Program
GCPF	Grade Crossing Protection Funds
HMA	Hot Mix Asphalt
ICC	Illinois Commerce Commission
IDOT	Illinois Department of Transportation
IL MUTCD	Illinois Supplement to the Manual of Uniform Traffic Control Devices
LPA	Local Public Agency
MFT	Motor Fuel Tax
MUTCD	Manual of Uniform Traffic Control Devices
NTE	Not To Exceed
STP	Surface Transportation Program
TBP	Township Bridge Program
tpd	Trains Per Day