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CHAPTER FIFTY-SIX

PARTIAL 3R PROJECTS

56-1.0 INTRODUCTION

Many highways cannot meet the values for full Resurfacing, Restoration, and Rehabilitation (3R) criteria. For these reasons, the Department has adopted a Partial 3R concept with different limits for geometric design criteria for pavement rehabilitation projects on existing highways. This is due to constraints in right of way, construction time, pavement conditions, or cost. The criteria for rehabilitation of existing highways are based on sound engineering practices, experience, and assessment of the basic principles of geometric design and how the criteria for other types of construction can be adapted to existing highways within practical limits. The goal of partial 3R is to preserve and maintain the existing highway system.

This chapter presents the Department's criteria and guide to the development of partial 3R projects. The objective of this chapter is to unify and standardize the project development, design criteria, field data collection, and final presentation of plans and related documents used in the development of partial 3R projects. This chapter should not be interpreted as specifications and should not replace sound judgment. The designer should refer to the INDOT *Standard Drawings* or the *Standard Specifications* to resolve questions concerning materials, standard details, workmanship, pay items, pay units, etc.

The designer is referred to Chapter Fifty-two, or the AASHTO *Policy for Geometric Design of Highways and Streets* for additional information.

Where a partial 3R project scope of work includes costly items such as bridge reconstruction or replacement or major alignment corrections which have a long service life, the project should be returned to the engineering assessment stage, for consideration as 3R, 4R, or possibly new construction.

56-2.0 ENGINEERING ASSESSMENT

The appropriate district development office, in cooperation with the Program Development Division and the Materials and Tests Division's Pavement Design Section, will determine the need for and propose partial 3R work on a given route. The district will make a recommendation

and justification regarding the type of partial 3R project. The recommendation will be reviewed by the Program Development Division's pavement management engineer, safety management engineer, and Pavement Preservation Program Management Group. The Group will use its Pavement Management System to determine the needs of the pavement and to document the condition of the pavement prior to approving the appropriate type of treatment. The Group will then discuss its findings with the district. The Program Development Division and the district are to ultimately concur in whether the partial 3R project should be designed as a preventative maintenance, functional, or structural treatment, or instead, a full 3R project. The safety management engineer may make recommendations relative to highway safety needs. The Program Development Division then authorizes the project. This information is provided to the district's development section, which then begins the design process.

Right-of-way acquisition should generally not be required for partial 3R work.

The following defines the typical scope of work to be performed for each type of partial 3R project.

56-2.01 Types of Partial 3R Projects

56-2.01(01) Preventative Maintenance Treatment

Preventative maintenance consists of pavement surface treatments used to preserve and extend the service life of the pavement. It should be designed in accordance with Section 52-7.04(01).

56-2.01(02) Functional Treatment

A functional treatment should be used to correct pavement deficiencies such as roughness or poor frictional properties. The intent is to improve the roadway serviceability by correcting distresses caused by traffic and environmental conditions. It should be designed in accordance with Section 52-7.04(02).

56-2.01(03) Structural Treatment

A structural treatment should be used where the existing pavement structure has failed due to a load-related distress. It should be designed in accordance with Section 52-7.04(03).

56-2.02 Analysis of Accident Data

Accident data should be analyzed in accordance with Section 55-5.01, except that a formal report is not necessary. Locations with a definite accident pattern should be indicated on the accident data computer printout. Spot-improvements work at such locations should either be incorporated into the project or programmed separately.

56-2.03 Project Classification

Classification of work as partial 3R, full 3R, partial 4R, or full 4R must be determined in accordance with Section 40-6.0.

56-3.0 PRELIMINARY DESIGN PROCESS

Preliminary project parameters and criteria are discussed and outlined below.

56-3.01 Review of Earlier Work in the Project Site

The designer should review the existing project files, plans, and resurface contract documents, if applicable, for additional information. Such plans generally contain original stationing, roadbed characteristics, structure information, and original drainage patterns. Previous resurface contract documents may contain valuable supplemental information. See Figure 5-2B for a blank Request for Traffic Projections form. See Figure 5-2C for a blank Request for Accident Records form.

56-3.02 Preliminary Project Schedule

The designer should prepare a preliminary schedule for the project with estimated completion dates for the following key activities or mileposts.

005 Project Started
040 Project Scope Complete
060 Start Plan Development
075 Survey Complete
085 Preliminary Field Check
110 Geotechnical Investigation (if required)
115 Final Pavement Design Approval

185 District Plans Complete
205 Plans Signed
215 Utilities Coordination
245 Ready for Letting

56-3.03 Environmental Document

The designer should verify the need for an environmental document and identify the required environmental permits. All projects require some level of environmental documentation. For a partial 3R project, such documentation consists of a Categorical Exclusion. A Categorical Exclusion is described in Section 7-1.01(01).

56-3.04 Bridge Structure Considerations

Where bridge structures are encountered within the project limits, the designer should consult with the district bridge engineer concerning needed improvements or needed repairs. A memorandum should be written to the Program Development Division's bridge management engineer with a copy to the Design Division's bridge rehabilitation engineer. The memorandum should provide details about the proposed project, and request their comments and recommendations. The memorandum should address proposed milling, spot pavement replacement, horizontal and vertical clearances if they are factors, weight restrictions, and all other factors which could affect the structures.

56-3.05 Unusual Soil Conditions

If there are indications of peat deposits, rock outcroppings, or other unusual soil conditions, long-term repair of such items should be programmed separately through INSTIP.

56-3.06 Stationing

Stationing should match the existing plans where possible. If the project limits extend beyond the stationing limits of the existing plans, the stationing should be extended to cover the project limits. Stationing should refer to the Reference Post System (RPS). For known features, see the Physical Features Inventory. Stations should be marked onto the pavement with traffic paint rather than spray paint. Stationing marking options are shown in Figure 56-3A.

If new metric stationing must be used, it should have an assumed starting station of 1+000.

56-3.07 Field Notes

The designer should ascertain that all field data is adequate to design the project. See Figure 56-3B, Collection of Field Data, for forms and format. Field notes should be collected in the form of a strip map showing all existing details including, but not limited to, intersecting roads, drives, and railroads, pipe structures, headwalls, curbs, manholes, survey monuments, guardrail, traffic detector loops, stop lines, crosswalk lines, raised pavement markers, areas of grading, patching, milling, utilities in the area, or other specialty items. All items shown in the field notes should have a station and offset reference. Field notes should start at the bottom of the page and proceed upstation. It is not necessary to strip-map sections of the project which are consistent and which no work, other than paving, is specified. For this situation, a note reading "Consistent section from Station ____ to Station ____." should be shown, thence continuing with the stationing. Cross sections should be collected in a survey level field book, or in an approved electronic format. Cross sections may include sections for pipe replacement, linear grading, drainage, profiles, or other miscellaneous information.

If a field book is used, the front cover of the field book should be labeled as shown in the example as follows:

FIELD NOTES
DES NO. _____
__(route)__
FROM ___ km _(dir.)_ of _(route)_ TO ___ km _(dir.)_ of _(route)_
RP ___+__ TO RP ___+__
_____ DISTRICT

The data collector should collect the field data in a logical manner. Information regarding the content of the field book is shown in Chapters Twenty-two and Twenty-three. The procedure for collecting field notes is as follows:

1. Walk the roadway to be sure that everything is logged.

2. By category, count all mailbox approaches, field entrances, commercial drives, etc. Those with unusual sizes or shapes should be located by station and offset, and the dimensions noted in detail.

3. Note locations of underdrains and outlets.

4. Note pavement and shoulder types and width changes by station or dimensions.

5. Note all of the information required relative to the items listed on the Review of Traffic Items.

6. The maintenance section, prior to the field survey, should have furnished a list of structures to be replaced, side ditches to be cleaned, etc. All dimensions, elevations, or other information needed to design the changes in these items should be gathered at this time.

7. If gabions or riprap are required, obtain all of the data necessary to incorporate them into the design.

8. If new or additional guardrail is required, information should be collected for design.

9. If outcroppings are to be removed, gather enough information in the field to be able to calculate the quantity involved.

10. If subgrade failures or slope failures are observed, the Materials and Tests Division's Geotechnical Section should be contacted for further evaluation.

The above is not a full nor a complete list of items necessary to collect field information. Additional field research may be needed to accomplish the design.

Additional survey data may be required. If so, a survey may be performed to gather additional information such as structure inlet and outlet elevations, existing pavement grades, drainage areas, channel cross sections, horizontal or vertical realignment of existing facility, right-of-way needs, etc.

56-3.08 Plan Development

See Section 14-2.08 for these requirements.

56-3.09 Field Checks

See Sections 14-2.08(03) and 14-2.08(08) for these requirements.

56-3.10 Pavement Design

See Section 52-9.0 for these requirements.

56-3.11 Revised Project Schedule

The designer should prepare a revised schedule for processing the project through the design phases including additional activities that were not included in the preliminary schedule. This revised schedule should be submitted to the district's head design engineer and should be updated on a monthly basis or as required. The revised schedule should allow a minimum of 14 weeks prior to the letting date as the time at which the contract documents should be complete and ready for transmittal.

56-4.0 GENERAL DESIGN PARAMETERS

56-4.01 General Standards Requirements

All INDOT *Standard Specifications* and *Standard Drawings* will apply. All deviations from the *Standard Specifications* and *Standard Drawings* will be subject to approval by the Contracts and Construction Division Chief. A deviation from the *Standard Specifications* will require detail drawings and special provisions subject to the approval of the Contracts and Construction Division Chief. The designer should see Section 19-2.0 for instructions on writing special provisions.

56-4.02 References and Research Sources

Many references and research sources are available to use as design references for supplemental information. Typical sources may include the following:

1. INDOT *Standard Drawings*
2. INDOT *Standard Specifications* and current Supplemental Specifications
3. AASHTO's *A Policy on Geometric Design of Highways and Streets*
4. Chapter Fifty-two, Pavement and Underdrain Design Elements
5. Chapter Fifty-four, Geometric Design of Existing Freeways (4R)
6. Chapter Fifty-five, Geometric Design of Existing Non-Freeways (3R)
7. Road Logs and Bridge Logs

8. Pavement Management System
9. No-Passing Zone Logs
10. Other miscellaneous sources including previous plans, pavement histories, etc.

56-4.03 Desirable and Minimum Pavement Width Requirements

The values shown in Figures 56-4A, 56-4B, 56-4C, and 56-4D should be used for the design of pavement, travel-lane, shoulder, and curb-offset widths.

The figures are titled as follows:

56-4A Pavement Widths for Rural Two-Lane Roads with Shoulders
56-4B Pavement Widths for Rural Multi-Lane Roads with Shoulders
56-4C Pavement Widths for Urban Two-Lane Roads with Curbs
56-4D Pavement Widths for Urban Multi-Lane Roads with Curbs.

If existing widths are greater than the values shown in the figures, the existing widths should be used.

The minimum width of pavement widening, where used, should be 0.6 m for constructability. The maximum width of pavement widening should not exceed that shown in Section 52-9.02(09). If widening varies from side to side of the existing pavement, a strip map or a typical cross section showing widening by stations should be provided. If cut or fill slopes are required, cross sections should be provided.

56-4.04 Mainline Pavement Considerations

Considerations to be made regarding specific mainline pavement and approaches items for each type of partial 3R treatment are shown in Figure 56-4E. Some of these items are further detailed below.

Work of a larger magnitude than that shown in Figure 56-4E for a given treatment may be done. Such work should be considered as a spot improvement, designed to the appropriate standards.

56-4.04(01) Auxiliary Lanes

Incorporating or upgrading turn lanes, parking lanes, passing blisters, or other auxiliary lanes to reduce the disruption of the flow of traffic should only be considered for a structural treatment. A geotechnical evaluation may be required. A partial 3R project involves few agreements and should require no additional right of way. The guidelines in Chapter Forty-six may not be attainable due to budgetary constraints and right of way acquisition. Auxiliary lanes which cannot be considered in the project may be separately programmed as a spot improvement or into a future full 3R or 4R project. See Chapter Fifty-four or Fifty-five for appropriate requirements.

56-4.04(02) Castings

Castings need not be reset if the overlay depth is equal to the milling depth. However, if the finished grade is different from the original grade, the adjustment of the castings should be incorporated into the work.

In an unincorporated area, Department storm sewer and sanitary sewer castings should be adjusted to grade as required. In an incorporated area, the local utilities should be required to adjust castings as required. See Chapter Thirty-six for more information.

In areas to be surface milled, all utility castings, as well as storm-sewer and sanitary-sewer castings, should be located and identified.

56-4.04(03) Cross Slopes

1. Travel Lanes. Pavement cross slopes on a tangent section should be reviewed for each type of partial 3R treatment. Improving pavement cross slope, where required, may be completed through staged construction, e.g., combining surface milling with pavement core investigation with a variable depth cross-section of HMA Intermediate course in accordance with the INDOT *Standard Specifications* prior to placing a uniform-depth HMA Surface course.

   A preventative-maintenance treatment is exempt from crown correction only if an existing rural-pavement cross slope is 2%, or if an existing urban-pavement cross slope is 1.5 to 3%. If the slope is outside this range, a combination of surface milling and a uniform-depth HMA Surface course should be used.

2. Shoulders. For a paved shoulder of 1.2 m or narrower, the cross slope should match the mainline cross slope. For a paved shoulder of wider than 1.2 m, the cross slope should match the existing shoulder slope, or should desirably be 4%. An aggregate- or earth-

shoulder slope should be 4% to 8%. In a horizontal curve, shoulder slope should be determined in accordance with Section 43-3.0.

56-4.04(04) Curbs

In areas where the curb height is not adequate for drainage, the pavement adjacent to the curb should be milled to the depth required for adequate drainage. If the curb is not structurally adequate, curb replacement should be considered. The pavement in these areas should be evaluated for possible future replacement.

56-4.04(05) Monuments

All existing Department monuments should be perpetuated. The designer is responsible for contacting the county surveyor for a list of monuments to be reset, witnessed, and monumented. All affected monuments are to be shown on the plans, or the required information is to be provided prior to construction.

56-4.04(06) Sight Distance Improvements

Existing geometrics should be maintained if no adverse accident history exists. See Chapter Fifty-five for desirable geometric criteria.

56-4.04(07) Subsurface Drainage

Subsurface drainage should always be considered and perpetuated in areas where it currently exists. For a structural treatment, addition of subsurface drainage should be considered. See Section 52-10.0 for subsurface drainage design requirements.

56-4.04(08) Superelevations and Curves

For a functional or structural treatment, evaluations of existing curves and superelevations should be performed. For a structural treatment, the pavement slope should be in accordance with the superelevation requirements shown in Section 43-3.0 where possible.

56-4.04(09) Surface Milling

Milling of HMA pavement will be used to adjust roadway cross section, develop or maintain curb exposure, remove wheel ruts, tie the new pavement into existing pavement, improve drainage, or remove undesirable areas or layers of pavement. Surface milling will be required as described in Section 52-7.05. Existing layers of HMA Surface Sand on or near the surface should be removed. Cores should be taken and analyzed by the district testing section to ensure that the proposed milling can be performed. Where milling is proposed near a signalized intersection, the designer should coordinate with the district traffic section to either avoid or replace existing signal loops. Details for milling at the project termini are shown in the INDOT *Standard Drawings*.

56-4.04(10) Urban Surface Drainage

Improvements to an urban surface drainage system to correct water ponding that may be causing pavement stability problems may be included in a partial 3R project. Where surface milling is required to achieve drainage of low spots where water collects, or to remove existing asphalt, pavement cores should be obtained in the area to assess the pavement structure.

56-4.05 Approaches

It has been the practice of the Department to maintain the surfaces of the approaches to its routes. The limits and type of treatment vary with the type of approach. The various treatments and limits used to maintain these approaches in conjunction with partial 3R work are provided in this section.

All approaches should be in accordance with the INDOT *Standard Specifications* and *Standard Drawings*. Approach data tables may be provided for supplemental information. See Chapters Forty-six and Fifty-two for approach design criteria where approach improvements are to be made.

56-4.05(01) Public Road Approach

This type of approach should be overlaid to the apparent right-of-way line, unless the approach is another Department-maintained route which has recently been, or is scheduled to be treated within two years of completion of the partial 3R project. Every effort should be made to construct shoulders on each approach where shoulders exist or are being constructed on the

mainline. The approach geometry should comply with the INDOT *Standard Drawings* as nearly as possible, especially where approaching a mainline pavement with AADT ≥ 3,000. An existing paved public road approach should be overlaid to match the existing mainline's edge line elevation, and tapered to match the profile on the approach at the apparent right-of-way line through the use of a milled notch at the terminus. See the INDOT *Standard Drawings* for details.

56-4.05(02) Drives

1. Asphalt. The partial 3R treatment of an asphalt drive consists of a 1.0-m wide wedge of HMA for Approaches placed adjacent to the mainline or shoulder pavement as shown on the INDOT *Standard Drawings*. This 1.0-m width, depending on the depth of the mainline overlay, may not be practical and may need to be extended to prevent a hump or adverse rollover (grade break) that is unacceptable.

2. Concrete. For a concrete drive, a wedge of HMA for Approaches should be placed over the concrete terminating in a milled notch as shown on the INDOT *Standard Drawings*. The approach design length is based on the overlay depth on the mainline and an acceptable resultant grade on the approach.

3. Aggregate. For an aggregate drive adjacent to a nonpaved shoulder, a 1.0-m widening with HMA for Approaches should be placed adjacent to the outer edge of the mainline or shoulder pavement. After placement of the widening, if a grade differential exists, it should be wedged out with compacted aggregate. Rollover criteria should be considered.

4. Field Entrance. This type of drive is typically earth. Fill is placed as required and compacted to the edge-of-shoulder or -pavement elevation.

56-4.05(03) Mailbox Approach

An existing mailbox approach may be substandard and most often cannot be corrected within the existing right of way. In a preventative maintenance or functional treatment, this type of approach should be overlaid to match the mainline elevation by use of the same paving material specified for the shoulders. In a structural treatment, a substandard approach deemed to be a hazard that can be improved should be improved to the geometrics shown in the INDOT *Standard Drawings*. If the standardized approach limits intercept the mailbox location, the mailbox should be reset. If the shoulders are not to be paved, mailbox approaches should be provided as described in Section 52-9.02(08).

56-4.06 Roadside Considerations

The designer must keep focused on the objectives of the scope of work that has been established for an individual partial 3R project in order to apply the appropriate roadside safety improvements.

Roadside safety improvements should be considered as described in Figure 56-4F. Some of these items are further detailed below.

56-4.06(01) Guardrail

Where required, a Guardrail Summary Table should be prepared for areas with guardrail placement or modifications.

The field notes and design calculations should be submitted with the project file. Guardrail requiring modifications not shown in the INDOT *Standard Drawings* should be detailed on the plans.

Guardrail end treatments type I may be in place but are now inappropriate due to higher design-year average annual daily traffic counts than they were warranted for. Such treatments should be considered for replacement with type OS or MS treatments as appropriate for a functional or structural treatment.

56-4.06(02) Linear Grading

Linear grading may be called for as a pay item only where earth is wedged at the outside edge of the shoulder where the profile grade has been raised due to overlaying or widening the pavement, or earth is wedged behind guardrail to obtain the required earth backup for the posts.

56-4.06(03) Mailbox Assemblies

Existing mailbox assemblies may remain in place during the performance of most partial 3R work. If a mailbox assembly is to be moved to accommodate a functional or structural treatment, a standard assembly as shown in the INDOT *Standard Drawings* should be considered for the replacement. See Section 49-3.01(02) for design criteria.

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If a mailbox height relative to the profile grade is lessened by overlaying its approach, and the box need not be replaced, its height should be adjusted accordingly.

56-4.06(04) Side Ditches

For a structural treatment, efforts should be made to re-establish drainage patterns and grades similar to the original construction. Where right of way is sufficient, efforts should be made to establish flow lines in accordance with Section 52-10.04(04) Item 2.

56-4.06(05) Side Slopes

For a preventative maintenance or a functional treatment, side slopes of steeper than 3:1 are acceptable.

All roadside slopes which appear to be steeper than 3:1 in a structural treatment will require a survey preparation of shoulder cross-section to determine the slope. Locations which appear to be particularly hazardous should be analyzed to determine if an adverse accident history exists, if it is cost effective to provide guardrail, or if a slope correction to a traversable level can be made. Possible guardrail locations will be identified at the field checks. See Sections 45-3.01 and 45-3.02 for guidance in determining side slopes. Where significant widening is proposed on the side of an existing embankment, preliminary plans with cross sections should be sent to the Materials and Tests Division's Geotechnical Section for evaluation.

56-4.06(06) Sidewalks

This work is not routinely incorporated into a partial 3R project. However, where it becomes necessary to work in these areas, curb ramps should be treated as shown in Figure 56-4F.

56-4.07 Culverts and Drainage Structures Considerations

Culvert modification or replacement requirements for structural treatment work are described in Section 31-4.04.

56-4.08 Traffic-Related Work

Traffic-related safety improvements should be considered as described in Figure 56-4F. Some of these items are further detailed below.

56-4.08(01) Highway Signs

Existing regulatory and warning signs anticipated to be impacted by structural-treatment construction operations should be reset or replaced as required in accordance with the INDOT *Standard Specifications* and *Standard Drawings*. See Chapter Seventy-five for guidelines regarding highway signs.

A summary sheet or details should be included in the plans to list or detail the locations for new and replacement sign types and required sign posts sizes and quantities.

56-4.08(02) Pavement Markings and Delineation

1. Markings. All permanent pavement markings, including transverse markings, should be replaced in kind. The district traffic section should review the locations and quantities for such markings. The designer should contact the district traffic section to coordinate the desired pavement marking plan. New locations for markings should not be included in the project unless approved by the district traffic engineer. The designer should consider the use of pavement markings as described in Chapter Seventy-six.

2. Snowplowable Raised Pavement Markers (RPMs). The designer should contact the district traffic section to confirm the existence of RPMs within the project limits and for special layout patterns that deviate from the INDOT *Standard Drawings*. See Section 76-3.02(05) for design criteria, and the INDOT *Standard Drawings* for basic layouts. If no existing RPMs are present, placement of new ones should be considered for a functional or structural treatment in accordance with Department policy.

   All existing RPMs should be reviewed for replacement. Where RPMs exist, the designer has the following options for replacing removed RPMs.

a. Option 1. Install refurbished castings and new prismatic reflectors.

b. Option 2. Install new castings and new prismatic reflectors.

c. Option 3. Replacements will be programmed by the district into the INSTIP annual replacement contract.

Option 1 is the most desirable and Option 3 is the most economical. A detailed plan sheet should be provided for layouts that differ from those shown on the INDOT *Standard Drawings*. A sheet may be included in the plans to list the color combinations and quantities of RPMs required for the project.

56-4.08(03) Traffic Signals

Detector loop locations should be identified and should be shown on the plans. All detector housings affected by the overlay operation should be adjusted to grade. Adjustments to existing signal equipment such as signal head reorientation, if required, may be incorporated into the work. A summary sheet or details should be included in the plans to list or detail the locations where loops, detector housings, or handholes are to be replaced or adjusted.

Traffic signals should otherwise only be considered for upgrading or placement in a structural-treatment project.

56-4.09 Design Exception Criteria

56-4.09(01) Level One Criteria Subject to Design Exception

If a work item is shown in Figure 56-4E or Figure 56-4F as A for a given type of treatment, a Level One or Level Two design exception request is required. A Level One exception is subject to approval of the Design Division Chief. Such work items are listed below.

1. Functional Treatment, A.
   a. Cross-slope correction to 2%
   b. Sidewalk curb ramps, repair existing
   c. Sidewalk curb ramps, place in existing sidewalks per ADA requirements

2. Structural Treatment, A.
   a. Cross-slope, convert tilt section to crown section

b. Cross-slope correction to 2%
c. Sidewalk curb ramps, repair existing
d. Sidewalk curb ramps, place in existing sidewalks per ADA requirements
e. Superelevation rate, improve to standard

56-4.09(02) Level One Criteria Not Subject to Design Exception

Some work items shown in Figure 56-4E or Figure 56-4F as B or C for a given type of treatment are Level One criteria, but a design exception request is not required. Such B work items are listed below.

1. Preventative Maintenance Treatment, B.
   a. Cross-slope correction to 2%
   b. Sidewalk curb ramps, repair existing
   c. Sidewalk curb ramps, upgrade existing to ADA requirements

2. Functional Treatment, B.
   a. Cross-slope, convert tilt section to crown section
   b. Shoulder width
   c. Sidewalk curb ramps, upgrade existing to ADA requirements
   d. Superelevation rate, improve to standard

3. Structural Treatment, B.
   a. Lane width
   b. Shoulder width
   c. Sidewalk curb ramps, upgrade existing to ADA requirements

The C work items are listed below.

4. Preventative Maintenance Treatment, C.
   a. Bridge railing, upgrade to current standards
   b. Cross-slope, convert tilt section to crown section
   c. Lane width
   d. Shoulder width
   e. Sidewalk curb ramps, place in existing sidewalks per ADA requirements
   f. Superelevation rate, improve to standard

5. Functional Treatment, C.
   a. Bridge railing, upgrade to current standards

b. Lane width

6. Structural Treatment, B.
   a. Bridge railing, upgrade to current standards

56-4.10 Maintenance of Traffic

A partial 3R project should be able to be completed without a road closure. If a road closure is necessary, the designer should follow the procedure described in Sections 82-2.0 and 82-7.02.

The designer should make certain that there is sufficient roadway and shoulder width to safely accommodate both the contractor's equipment and the flow of traffic. If roadway shoulders are to be utilized to carry traffic during construction, they must be capable of withstanding the expected traffic loads and volumes. A traffic control plan should be developed as described in Section 82-2.0. The designer should consider the use of temporary traffic control devices as described in Chapter Eighty-three.