

Limited Scope Project Delivery Guideline

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Limited Scope Project Delivery Approach

Overview

In order to effectively administer the planning and design of transportation-related problems with a limited scope, the NJDOT has developed a Limited Scope Project Delivery Approach. The Limited Scope project types and parameters are referenced within this section.

The main difference between the Limited Scope Project Delivery Approach and the standard Capital Project Delivery (CPD) process is that the Limited Scope Project Delivery Approach does not have a formal PE Phase. The applicable CPD process PE activities and corresponding Work Breakdown Structure (WBS) deliverables have been distributed to the Limited Scope CD and Limited Scope FD Phases. The two key former Limited Scope PE deliverables were distributed as follows: Approved Environmental Document is in the Limited Scope CD Phase and approved Design Exception Report (if needed) is in the Limited Scope FD Phase.

Eliminating the formal PE Phase for this approach is possible because the project scope should not change once the Preliminary Preferred Alternative (PPA) is selected at the end of Limited Scope CD Phase. By eliminating the formal Limited Scope PE Phase, the Department can realize significant savings in administrative costs and time.

Limited Scope Project Delivery Approach History

The NJDOT introduced the Limited Scope Project Delivery Approach for two types of projects that met approved criteria:

- pavement resurfacing (“mill ‘x’, pave ‘x’ plus one”)
- bridge deck/superstructure replacement

Templates were developed for each of these project types to assist in performing CD and FD activities and are listed on the Limited Scope Project Delivery Approach webpage. These tools were developed to facilitate and expedite the delivery process for Limited Scope projects. Although customization of these tools is possible in certain cases, advance FHWA concurrence is needed for any customization of these templates before commencing CD or FD.

It is important to understand that the Limited Scope Project Delivery Approach enables an expedited process to be used if warranted project scope produces only limited project impacts. The warranted project scope includes those scope items identified in CD necessary to address the problem statement and any necessary safety and/or other deficiencies required to be addressed based upon the project type.

In order to maintain the integrity of the Limited Scope Project Delivery Approach, the CD Phase should consist of an objective assessment of the warranted scope and related impacts to determine if the project meets the requirement of Limited Scope. Checklists should be completely filled in and comments should clarify/confirm the scope to be included. Open ended comments should be avoided. If ultimately, the CD assessment indicates that a project’s scope does not meet Limited Scope requirements, the project needs to be delivered utilizing the standard CPD Process.

The NJDOT, with concurrence from FHWA, subsequently expanded the Limited Scope Project Delivery Approach to provide for a faster, more efficient way to deliver small-scope projects that may come from other NJDOT Management Systems (e.g., Drainage Management System, Safety Management System). Limited Scope eligibility for these additional project types is premised on the requirement that existing footprints are maintained, Certified CE documentation is applicable with only minor permits, no or minimal utilities and/or no permanent right of way acquisition, except for ADA compliancy.

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The additional project types include:

- Drainage Improvement
- Simple Culvert Structural Repair
- Median Crossover Improvement
- Sign Structure Installation *
- ITS Installation
- Simple Intersection Improvement (no reduction in lane or shoulder width, minimal utility/right of way involvement)
- Thin Surface Treatment
- High Friction Surface Treatment
- Concrete Pavement Repair
- Rockfall Mitigation
- Guiderail Replacement
- Horizontal Curve Sign
- Additional project types as necessary upon approval by FHWA

* Design exception approval of substandard minimum vertical clearance is required.

Note: Full Depth Reconstruction projects shall utilize the standard CPD Process.

Features of pavement resurfacing projects that have been approved for Limited Scope projects may include:

- Cross-slope Improvement
- Shoulder Reconstruction (not to exceed 10% of the total pavement area for concrete and HMA) **
- Full Depth Pavement Repair (not to exceed 10% of the total pavement area for concrete and HMA) **
- Full Depth Reclamation (not to exceed 10% of the total pavement area for concrete and HMA) **
- Cold and Hot In-Place Recycling
- Additional features as necessary upon approval by FHWA

** If projects have Full Depth Pavement Repair or Full Depth Reclamation that exceeds 10% of the total pavement area, a pavement life cycle cost analysis shall be conducted and approved by FHWA for the project to be considered Limited Scope. If the pavement life cycle cost analysis is approved by FHWA, CSDE evaluation and design exception approval is not required. If the pavement life cycle cost analysis is not approved by FHWA, the project shall proceed as a reconstruction project and utilize the standard CPD process.

As noted above, there are several pavement treatments applicable to the Limited Scope process. These treatments include: Thin Surface Treatment, Concrete Pavement Repair & Pavement Resurfacing (“mill ‘x’, pave ‘x’ plus one”). When developing the scope for these pavement projects it is important to know which roadway design features, such as, centerline rumble strips, curb ramps, utility relocation, guiderail, etc. are applicable for each pavement treatment. For that reason, the NJDOT has developed guidance outlined in the NJDOT Pavement Perseveration Guidance. (Attachemnt A)

Pavement Resurfacing and Bridge Deck/Superstructure Replacement Projects

The purpose of pavement resurfacing and bridge deck/superstructure replacement projects is to address the identified deficiencies in order to extend the functional and structural life of the assets. The project scope is not intended to go beyond addressing the defined purpose and need. Pavement resurfacing and bridge deck/superstructure replacement projects that involve acquisition of right of way or easements, environmental

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impacts or permanent utility relocations are generally not applicable to the Limited Scope Project Delivery Approach and should typically be designed using the standard CPD process. These impacts need to be identified in CD and properly noted in the applicable Checklist.

The following are the general concepts for both the pavement resurfacing and bridge deck/superstructure replacement projects:

- Pavement resurfacing and bridge deck/superstructure replacement projects are typically identified using the NJDOT Pavement Management System and the NJDOT Bridge Management System, but can be generated from individual problem statements.
- Due to limited seasonal availability to conduct aerial survey, mapping for Limited Scope projects may be acquired under a separate task order in the CD Phase (instead of acquired at the beginning of FD) and provided to the Designer upon availability.
- Pavement resurfacing and bridge deck/superstructure replacement projects should not involve ITS impacts, access impacts, or the acquisition of right of way. Temporary easements may be considered on a project-by-project basis to accommodate construction activities.
- Utility involvement for pavement resurfacing and bridge deck/superstructure replacement projects is generally limited to manhole, valve, and inlet resets. Temporary utility relocations may be considered on a project-by-project basis to accommodate construction activities.
- Guiderail should be evaluated and upgraded to current standard, wherever feasible.
- ADA compliance is required.
- Pavement resurfacing and Bridge deck replacement projects only require a Self-Certified CE Document.
- Superstructure replacement projects require a CE Document.
- Selected network activities can be added or removed on Limited Scope Projects on a project-by-project basis.

The following are the general concepts for pavement resurfacing projects:

- Guiderail should be evaluated and upgraded to current standard, wherever feasible
 - A pavement resurfacing that overlays a bridge deck is generally treated as a preventive maintenance scope and therefore, if the work is to be federally eligible for participation, justification should be provided supporting that the preventive maintenance recommendation is part of a systematic approach and that application of the overlay will extend the useful life of the bridge and bridge deck until currently programmed improvements are implemented. Otherwise, a 10 year service life needs to be achieved. As an alternative, the bridge portion could be included using other funding.
- A pavement resurfacing “mill 'x', pave 'x' plus one” project has the ability to perform Full Depth Concrete Joint Repair.

The following are the general concepts for bridge deck/superstructure replacement projects:

- Bridge deck/superstructure replacement projects require a Design Exception Report if controlling substandard design elements are present on the structure.
- Superstructure replacement projects requiring environmental documents other than a Categorical Exclusion Document cannot use the Limited Scope Project Delivery Approach.
- A bridge deck/superstructure replacement project has the ability to overlay a bridge deck with more than 1” of pavement to accommodate Bridge Deck Waterproof Surface Course overlays.

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Typical Pavement Resurfacing and Bridge Deck/Superstructure Replacement Projects Tasks by Delivery Phase

Problem Screening

- Identified roadway and bridge deck/superstructure problems are screened.
- The NJDOT Management System owner reviews the problem to determine if the Limited Scope project delivery approach is appropriate.
- The Pavement Management System owner develops a pavement recommendation.
- Capital Program Management receives approval from the CPC to advance the project to CD using the Limited Scope project delivery approach based on project parameters and the pavement recommendation.

Concept Development

- The Limited Scope CD Network Diagram has been customized to eliminate activities that are typically not applicable to address the purpose and need of the proposed project, while keeping the activities needed to adequately select the best solution for the problem.
- The CD Activity Descriptions include additional guidance to perform a Limited Scope CD study, including modified scope and schedule suggestions.
- If environmental products or deliverables, other than a Self-Certified CE Document or CE Document (e.g., Section 4(f), Section 106) are needed in a Limited Scope project, the applicable activities may be added through coordination with FHWA.
 - Selected network activities can be added or removed on a project-by-project basis.
- The Designer and Project Manager utilize the Limited Scope CD Pavement or Bridge Checklist to:
 - Determine the full impacts associated with the identified problem
 - Collect and document data and verify the impacts with internal/external SMEs
 - Verify that the problem's solution can be determined and produced using the Limited Scope Project Delivery Approach.
- The checklist will be used as a tool during the field visit and later to document additional information. If through the field visit and subsequent information it is determined that the scope of the solution is beyond the Limited Scope Project criteria, the Limited Scope Study is terminated. In order to proceed, the proposed project is returned to the Capital Program Committee to advance under the standard CPD process.
 - If issues identified during the field visit require further discussion, the Project Manager holds a Scope Team Meeting to resolve outstanding issues.
- A Limited Scope CD Report will only address the activities in the project-specific Limited Scope Project primavera schedule template.
- During the preparation of the Limited Scope CD Report, the Project Manager utilizes the Limited Scope FD Network Diagram and Limited Scope FD Activity Descriptions to prepare the Limited Scope FD Scope Statement.

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Final Design

- The FD Activity Descriptions include additional guidance to perform a Limited Scope FD project, including modified scope and schedule suggestions.
- The Limited Scope FD Network Diagram has been customized to eliminate activities that are typically not needed in support of “mill ‘x’ pave ‘x’ plus one” or bridge deck/superstructure replacement projects. On a project-by-project basis, previously removed standard template activities may be added through coordination with FHWA. However, this should be done prior to beginning the FD Phase.
- If a utility relocation is needed in a Limited Scope project, the Department’s utility process needs to be followed whether utility relocations are permanent or temporary.
- At the beginning of FD, survey work is performed, base maps are produced, and horizontal and vertical geometry is prepared.
- If controlling substandard design elements are present on the structure, a design exception report is prepared for approval.

Checklist and CD Report Requirements

The following table provides information on what is required for FHWA approval when advancing to Final Design.

Project Type	Checklist Required?	CD Report Required?	Other Requirements
Pavement resurfacing	Yes	Yes	
Bridge deck/superstructure replacement	Yes	Yes	
Drainage Improvements	Yes	Yes	
Simple Culvert Structural Repair	Yes	Yes	
Median Crossover Improvement	Yes	Yes	
Sign Structure Installation	Yes	No	Include a Summary Document if there are multiple sites
ITS Installation	No	No	A Systems Engineering Review Form (SERF) is required, and if applicable, a Concept of Operations Report.
Simple Intersection Improvement	Yes	Yes	
Thin Surface Treatment	Yes	No	Include Pavement Recommendation if available.
Concrete Pavement Repair	Yes	No	Include Pavement Recommendation if available.
Rockfall Mitigation	Yes	No	Include Current Ranking withing Rockfall Mitigation System Ranking if available
Guiderail Replacement	Yes	Yes	
Mid-Block Crosswalk	Yes	Yes	
Horizontal Curve Sign	Yes	No	

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Addressing ADA Compliance on Limited Scope Projects

Americans with Disabilities Act (ADA) compliance is required on limited scope projects. Achieving this compliance may involve relocating utilities and acquiring right-of-way (ROW). Often, the timeframe to acquire ROW will exceed the time needed to complete the project design; thus significantly impacting the project schedule and subjecting the pavement to further deterioration.

To address this issue, an “Accelerated Right-of-Way Process for Sidewalks” has been developed to effectively deliver limited scope projects and address ADA compliance with ROW Impacts.

Accelerated Right-of-Way Process for Sidewalks

The Accelerated Right-of-Way Process for Sidewalks is to be used for sidewalk and curb ramp work in Limited Scope Resurfacing Projects, ADA Contracts, and Full-Scope Projects. For Limited Scope Resurfacing Projects, this process shortens the timeframe needed to acquire right-of-way associated with sidewalk work by moving key, initial ROW activities into CD and maintaining other ROW activities in FD phases and eliminating the need for the PE phase. For LS projects with ADA requiring ROW and other ADA related projects, the process improves the efficiency of acquiring parcels needed to accommodate ADA sidewalk work.

How it works

The Accelerated Right-of-Way Process for Sidewalks utilizes the existing Capital Project Delivery (CDP) guidance framework of activity descriptions and network diagrams. The activity framework remains the same, but the work within the ROW activities has been simplified, thus reducing the activity duration.

The following is a chart that outline the time savings:

Activity No	Activity(ies)	Standard Durations (Working Days)	Proposed Duration (Working Days) for Sidewalk Easement
3110 & 3115	Initiate ROW Impact Plan and Prepare ROW Report	40	20
3120	Hold ROW Kickoff Meeting	15	10
3125	Prepare Initial ROW Estimate	20	15
4600	Conduct Title Search	60	15
4605	Prepare ROW Plans & Documents	40	15
4610	Review ROW Plans & Documents	20	15
4615	Prepare Pre-Final ROW Submission	15	Not Applicable
4620 & 4635	Review Pre-Final FOW Submission and ROW Acquisition Kickoff Meeting	20	Not Applicable
4625	Prepare Final ROW Submission	15	15
4630	Process Final ROW Submission	10	5
4670	Acquire ROW	280	60
4645	Obtain ROW Environmental Reevaluation	0 (if not on critical path)	0 (If not on critical path)
4650	Authorize ROW	0 (not on critical path)	0 (If not on critical path)
Total Working Days:		535	170
Total Months:		26.75	8.5

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The durations for ROW activities for the Accelerated Right-of-Way Process for Sidewalks are significantly reduced because they use the following tools:

- *Simplified Title Research*
- *Administrative Determination of Value (ADV)*
- *Sidewalk ROW Agreements*
- *Easement Clauses*
- *Simplified Offer Letter for Affected Property Owners*

The following examples state how these tools significantly reduce the ROW durations:

- A Simplified Title Research is utilized for Activity 4600, “Conduct Title Search”. The title research is limited to researching and verifying just the current property owner. This approach differs from the standard approach of researching current and past owners, as well as any lien holders. The result of this new innovation is a 45 working day reduction in time.
- ADV, Sidewalk ROW Agreements, Easement Clauses, and a Simplified Offer Letter for Affected Property Owners are used for Activity 4670, “Acquire ROW”. The ADV is an informal estimate of value up to \$25,000. For values in excess of \$25,000, a full property appraisal is needed. Utilizing this tool results in a Much shorter timeframe (couple weeks), vs. full appraisal (couple months). Sidewalk ROW agreements also significantly reduce the overall duration for this activity. This agreement can be used to construct new sidewalk installations and existing sidewalk restoration. This new agreement also contains easement clauses that simplify the process and reduce duration. Finally, the simplified offer letter for affected property owners contain less environmental clauses and simplified language. The result of these innovative tools is a 220 working day reduction in time.

Benefits

There are many benefits using the Accelerated Right-of-Way Process for Sidewalks, such as: acquiring the ROW needed for LS Resurfacing Projects within available timeframes associated with pavement preservation projects while advancing the Department’s compliance with ADA Requirements. When applied to other projects with limited ROW needs due to sidewalk work, the approach will help accelerate project delivery. Other benefits include an increased efficiency for staff through turn-key elements of the process and overall cost savings associated with simplified property valuations (ADV’s) and simplified title research.

ADA Documentation

If full ADA compliance is not achievable, it needs to be documented by the in the [Technically Infeasible Form](#).

ADA with ROW Impacts Schedule Guidance

Additional activities associated with environmental impacts, permits, and access may need to be included in project-specific schedules and budgets based upon project-specific ADA designs and impacts.

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ADA Compliance for Pavement Preservation Projects

Purpose

The primary purpose of this guidance is to explain, at a high level of detail, how ADA compliance, NJDOT Pavement Preservation Guidance, the Limited Scope process, and the Accelerated Right-of-Way Process for Sidewalks tie together.

ADA Compliance

The Americans with Disabilities (ADA) Act of 1990 is a wide-ranging civil rights law that prohibits discrimination based on disability. The Federal disability definition is “a physical or mental impairment that substantially limits one or more major life activities; has a record of such an impairment and is regarded as having such an impairment.”. According to Title II Regulation, disability discrimination is prohibited by all public entities whether they receive Federal funds or not. Since the NJDOT is a public entity, ADA compliance is required on all NJDOT Capital projects.

In 2013, Department of Justice/Department of Transportation Joint Technical Assistance on the Title II of the Americans with Disabilities Act Requirements to Provide Curb Ramps when Streets, Roads, or Highways are Altered through Resurfacing was issued. This guidance provided clarification on the types of resurfacing activities that are considered alterations requiring ADA compliant curb ramps to be provided. These activities mostly fall into the category of pavement preservation treatments and require recommended treatments to be performed within a limited window of time to ensure maximum benefit to the overall pavement structure’s service life from each treatment as is consistent with an effective pavement asset management approach.

NJDOT Pavement Preservation Guidance (see Attachment A)

The NJDOT Pavement Preservation Guidance outlines the Departments’ policy on pavement preservation. Today’s increasing budget constraints require that state transportation agencies perform more work with less money. Historically, the emphasis of highway departments has been on building new roads, but the new focus is on maintaining and preserving existing pavement surfaces. Pavement preservation is a critical component of an agency’s asset management plan to achieve and sustain a desired safe state of good repair over the lifecycle of roadway assets. Pavement preservation will prevent a pavement from requiring corrective/emergency maintenance or major rehab /reconstruction. Pavement preservation is completing the right repair on the right road at the right time. For NJDOT, the vehicle to deliver pavement preservation projects is the Limited Scope project delivery process.

Pavement Preservation projects are developed directly from NJDOT’s Pavement Management (PMS) Access data base. Factors affecting the priority ranking of segments of pavements include SDI, IRI and associated Final Pavement Rating. Segments are evaluated based on their condition and proximity to one another and then combined into contiguous lengths suitable for development into a project. Ultimately, a Pavement Resurfacing Needs List is created that identifies all potential projects needing treatment based on the PMS database used in the analysis.

Limited Scope Process

The Limited Scope project delivery process is a way for the NJDOT to design and construct Capital projects to address deficiencies in order to extend the functional and structural life of the Department’s assets. The main difference between the Limited Scope Project Delivery Approach and the standard Capital Project Delivery (CPD) process is that the Limited Scope Project Delivery Approach does not have a formal Preliminary Engineering (PE) Phase. The applicable standard CPD process PE activities and corresponding PE deliverables have been distributed to the Limited Scope Concept Development (CD) and Limited Scope Final Design (FD)

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Phases. Upon completion of CD, the NEPA document is developed and approved. The Design Exception Report (if needed) is prepared during the FD phase.

For pavement preservation projects, the Limited Scope process helps expedite delivery of pavement preservation treatment projects before existing pavement deterioration progresses to a point where a more extensive and costly treatment is needed. During CD, the scope of work is developed and then tested to ensure that the warranted project scope includes only those scope items identified as necessary to address the problem statement (driven by the PMS), and any necessary safety and/or other deficiencies determined to be required within the project. Additionally, Limited Scope eligibility is premised on the requirement that existing footprints are maintained, Certified CE documentation is applicable with only minor permits, no or minimal utilities and/or no permanent right of way acquisition, except for ADA compliancy, is required.

This approach is possible because the problem statement is based exclusively on PMS needs and the requirement that project related impacts are constrained to a point where no alternatives other than the pavement preservation treatment itself can satisfactorily address the problem statement and still be considered limited scope. LS project purpose and need is tied directly to the problem statement which is based on the condition of the pavement as identified in the PMS.

If it is found during CD that all the parameters described above are met, the CD report is finalized and the NEPA document is completed prior to advancing directly to FD as a LS project. If it is determined that the parameters are not met, the project remains in CD for further study or reverts to the standard CPD process that includes a PE phase.

By eliminating the formal Limited Scope PE Phase, NJDOT can realize significant savings in administrative costs and time. As previously stated, ADA compliance is required on all NJDOT Capital projects, including Limited Scope projects. However, achieving ADA compliance may involve relocating utilities and acquiring right-of-way (ROW). Often, the timeframe to acquire ROW utilizing the standard ROW acquisition methods will exceed the time available to complete the project design in order to deliver pavement preservation projects to construction on time; thus, significantly impacting the project schedule and subjecting the pavement to further deterioration. To address this issue, an Accelerated Right-of-Way Process for Sidewalks has been developed in accordance with Federal requirements to effectively deliver limited scope projects and address ADA compliance.

Additional Limited Scope Guidance

In addition to the Limited Scope guidance listed above, the CPD website contains the following Limited Scope Project approach guidance documents for example:

- Limited Scope Concept Development Phase Network Diagram
- Limited Scope Concept Development Phase WBS
- Limited Scope Concept Development Scope Statement Template
- Limited Scope Concept Development Bridge Checklist
- Limited Scope Concept Development Pavement Checklist
- Limited Scope Concept Development Report Bridge Example
- Limited Scope Concept Development Report Bridge Template
- Limited Scope Concept Development Report Pavement Example
- Limited Scope Concept Development Report Pavement Template

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- Limited Scope Final Design Phase Network Diagram
- Limited Scope Final Design Phase WBS
- Limited Scope Final Design Scope Statement Template

Limited Scope guidance can also be found within the following CPD documents:

- Concept Development Phase Activity Descriptions
- Preliminary Engineering Phase Activity Descriptions
- Final Design Phase Activity Descriptions
- Concept Development WBS Dictionary
- Preliminary Engineering WBS Dictionary
- Final Design WBS Dictionary

Note:

1. The Limited Scope CD and FD Network Diagrams and WBS Diagrams are specifically designed for the delivery of pavement resurfacing “mill 'x', pave 'x' plus one” and bridge deck/superstructure replacement project types. Other approved Limited Scope project types may utilize these diagrams as a basis for developing a project-specific scope and schedule.
2. The work associated with ADA compliance with ROW impacts is not included in the following limited scope guidance documents: activity descriptions, network diagrams, WBS, etc. If applicable, this work needs to be added to a project specific scope of work, network diagram and schedule.

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Attachment A

NJDOT Pavement Preservation Guidance

Introduction

Today's increasing budget constraints require that state transportation agencies perform more work with less money. Historically, the emphasis of highway departments has been on building new roads, but the new focus is on maintaining and preserving existing pavement surfaces. This shift has resulted in five pavement treatment categories:

Rehabilitation: Structural enhancements such as resurfacing and structural overlays that extend the service life of an existing pavement and/or improve its load-carrying capacity.

Reconstruction: Replacement of the entire existing pavement structure by the placement of the equivalent or increased pavement structure.

Pavement Preservation: Programs and activities employing a network level, long term strategy that enhances pavement performance by using an integrated, cost-effective set of practices that extend pavement life, improve safety, and meet road user expectations. It is a strategy of surface treatments and preventive maintenance intended to retard progressive failures and reduce the need for routine maintenance and service activities.

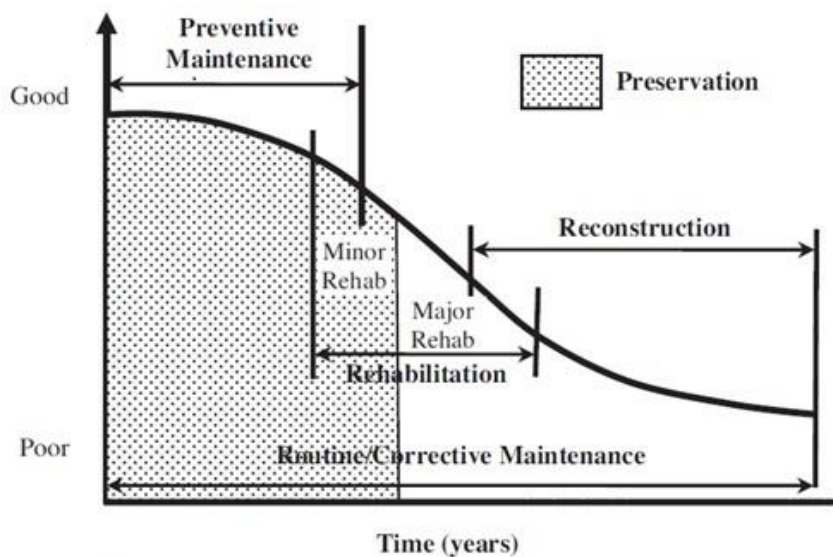
Corrective Maintenance: Performed after a deficiency occurs in the pavement, such as loss of friction, moderate to severe rutting, or extensive cracking. May also be referred to as "reactive" maintenance.

Emergency Maintenance: Performed during an emergency situation, such as a blowout or severe pothole that needs repair immediately. This also describes temporary treatments designed to hold the surface together until more permanent repairs can be performed.

All categories, along with some limited new construction, are needed in a comprehensive pavement program. However, emphasizing pavement preservation is a critical component of an agency's asset management plan to achieve and sustain a desired safe state of good repair over the lifecycle of roadway assets. Pavement preservation will prevent a pavement from requiring corrective/emergency maintenance or major rehab /reconstruction. Pavement preservation is *completing the right repair on the right road at the right time*.

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Source: Adapted from Peshkin et al. 2007.

Definition and Purpose of Pavement Preservation

Pavement preservation consists of work that is planned and performed to improve or sustain the condition of the transportation facility in a state of good repair. Pavement preservation treatments reduce the amount of water infiltrating the pavement structure, protect the pavement system, slow the rate of deterioration, or correct surface deficiencies such as roughness and non-load related distress. These treatments generally do not add capacity or structural value but do restore the overall condition of the transportation facility. They are not applicable and should never be applied if fatigue-related distress exists in the pavement.

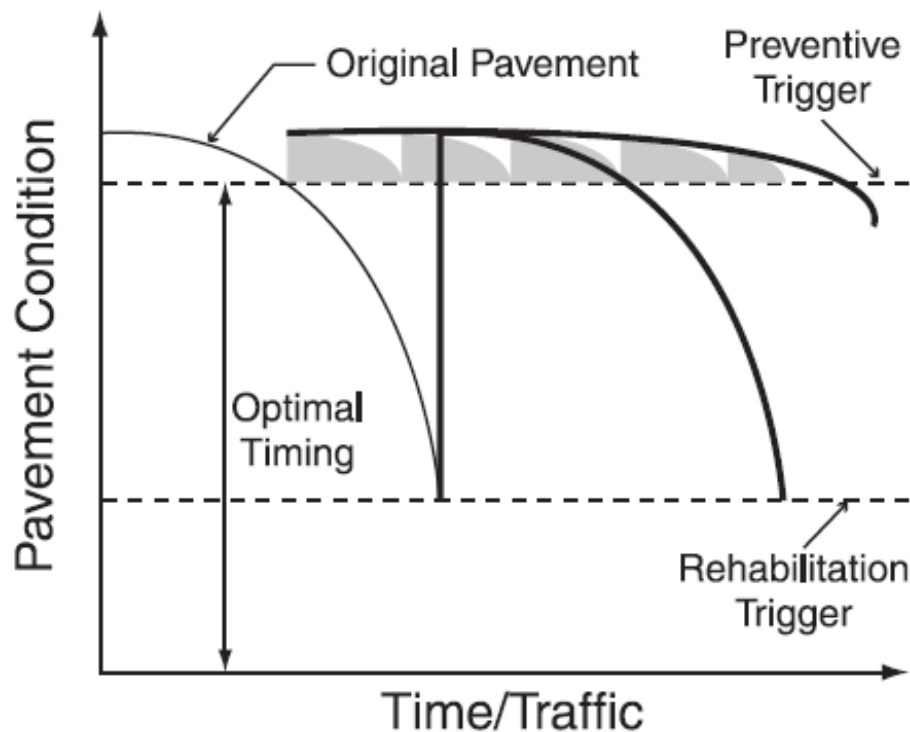
Pavement Life

Pavements are increasingly being designed for longer service lives, and longer-lasting pavements mean more opportunity for preservation over the life of the pavement structure. To demonstrate the value of a long life pavement, it needs to show a lower life cycle cost than traditional alternatives, factoring in both the initial construction cost and ongoing preservation over its functional life. In this approach, keeping pavement treatment costs down is helpful to the success and viability of the design. Under a successful pavement preservation program, maintenance should be less frequent and preservation activities must be cost-effective.

An important aspect for cost-effective preservation over the pavement life cycle is the selection and timing of preservation activities. Using the right preservation treatment at the right time will help you get the maximum benefit. This depends partly on the condition of the pavement and where it is in its life cycle.

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Source: FHWA Pavement Preservation Fact Sheet, 2000

Under most circumstances, the condition of a pavement over time can be represented by a curve similar to the one shown above. The worse its condition gets, the more expensive the treatment required to restore the pavement to good condition, so application of an appropriate treatment in the right general area on this curve is imperative. A relatively inexpensive pavement preservation treatment earlier in the pavement's life cycle, while it may only bring a slight improvement in the condition of the pavement, still makes a tremendous difference when considering that it postpones or avoids the need for a much more expensive treatment later on. Pavement preservation is most effective when a pavement is structurally sound and exhibits little or no distress. Examples of pavement preservation activities include crack sealing and surface treatments such as chip seals or slurry seals, along with thin (non-structural) overlays and minor rehabilitation such as resurfacing.

Program Development

The intent of the pavement preservation program is to select, design, and construct pavement preservation treatments in an expedited fashion to extend pavement life and maintain the pavement surface at the highest possible level of serviceability. The Pavement Management System (PMS) provides a first cut list of candidate projects for all of the Preservation treatments. The candidate project list is then reviewed and adjusted based on several project factors to create the project list.

Project Selection Guidelines

The Bureau of Pavement & Drainage Management and Technology, through its pavement management system, has developed pavement preservation strategies to incorporate both preservation and rehabilitation work at appropriate intervals to preserve pavement condition throughout its service life.

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Candidate preservation projects are selected based on the age, continuous length, ADT and condition. The PMS develops the candidate list by querying the database for all road segments that meet the age since last treatment criteria. The list is refined further by selecting all road segments that meet a minimum continuous length and lane mile criteria and then prioritized based on the traffic volume with higher volume roads getting a higher priority. The surface distress of each road segment is visually assessed by pavement design engineers to determine if the condition is suitable for preservation. The pavement design engineer then determines the appropriate preservation treatment(s).

It is possible that initially-identified pavement preservation projects may be eliminated if they become too complex as a result of the need to increase capacity, improve traffic operations, or address complex safety betterments. Preservation projects are time sensitive due to the continuous deterioration of the pavement as well as seasonal temperature variations which reduce the construction season for many treatments. In instances where delayed delivery is anticipated, other projects meeting the established criteria may be substituted for eliminated preservation projects in order to maintain a balanced program and provide for planned expenditures.

NJDOT Pavement Preservation Treatments

- **Thin Surface Treatment Type I** (*Fog Seal, Slurry Seal, Chip Seal, etc.*)
 - **Fog Seal** – Emulsified asphalt binder application to seal good pavement and prevent water infiltration.
 - Typically applied at 0.1-0.15 gallons/sq. yard
 - No milling
 - Applied 2-8 years after initial surface course provided the surface condition is good based on visual assessment by pavement designer
 - **Slurry Seal** – A homogenous mixture of emulsified polymer modified asphalt, water, well-graded fine aggregate and mineral filler that is applied in a cold slurry form that sets up quickly and hardens to form a durable surface.
 - Typically applied at a rate of 16 to 20 lbs. per square yard of aggregate and 0.3 gallons per square yard of emulsion.
 - Optional incidental profile milling for smoothness
 - Applied 2-8 years after initial surface course provided the surface condition is good based on visual assessment by pavement designer
 - **Chip Seal** – Application of an asphalt binder or emulsified asphalt binder to a roadway surface followed by application of aggregate which is then rolled and swept prior to opening to traffic
 - Typically applied at a rate of 0.4 to 0.65 gallons per square yard of binder followed by an application of 20 to 40 lbs. per square yard of aggregate.
 - Optional incidental profile milling for smoothness and transitions
 - Applied 2-8 years after initial surface course provided the surface condition is good based on visual assessment by pavement designer
- **Thin Surface Treatment Type II** (*Micro surfacing, Cape Seal, Ultra-thin Friction Course (UTFC), High Performance Thin Overlay (HPTO), etc.*)
 - **Micro surfacing** – A homogenous mixture of emulsified polymer modified asphalt, water, well-graded fine aggregate and mineral filler that is applied in the same manner as slurry seal.
 - Typically applied at a rate of 18 to 22 lbs. per square yard of aggregate and 0.35 gallons per square yard of emulsion.
 - Optional incidental profile milling for smoothness

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- Applied 2-8 years after initial surface course provided the surface condition is good based on visual assessment by pavement designer
 - **Cape Seal** – A surface treatment that involves the application of slurry seal or microsurfacing over a newly constructed surface treatment, usually chip seal.
 - Typical application of chip seal followed by typical application of slurry seal or microsurfacing.
 - Incidental profile and micro-milling for transitions and smoothness.
 - Applied 2-8 years after initial surface course provided the surface condition is good based on visual assessment by pavement designer
 - **Ultra-thin Friction Course (UTFC)** – an ultra-thin application of a gap-graded Hot Mix wearing course placed over a heavy application of polymer modified emulsion by a specialized machine in a single pass.
 - Typically applied at 3/4" - 1" thick
 - Incidental milling at transitions. Optional profile milling for smoothness
 - Applied 2-8 years after initial surface course provided the surface condition is good based on visual assessment by pavement designer
 - **High Performance Thin Overlay** – Polymer modified binder rich hot mix asphalt overlay.
 - Typically applied at 1" thick
 - Incidental milling at transitions. Optional profile milling for smoothness
 - Applied 2-8 years after initial surface course provided the surface condition is good based on visual assessment by pavement designer
- **Concrete Pavement Repair** – Includes partial depth and full depth repairs as well as localized slab replacements followed by diamond grinding and joint/crack resealing. When quantities exceed 10% of project area, life cycle cost analysis should be performed to ensure repair is the most cost effective treatment.
- **Limited Scope Pavement Resurfacing (LS) ("mill 'x', pave 'x' plus one")** - Traditional hot mix asphalt overlay with neat or modified binder and equal depth milling and paving or equal depth milling and paving plus one inch in order to improve substandard cross slopes.
 - Typically applied at 2-4" thick, however can include deeper applications where warranted by deep cracking within the asphalt pavement thickness but not deeper.
 - Includes partial depth and full depth repairs as well as localized shoulder and mainline reconstruction. When quantities exceed 10% of project area, life cycle cost analysis should be performed to ensure repair and resurfacing is the most cost effective treatment.
 - Full extent milling required
 - Applied when surface distress index falls below 2.4

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Roadway Design features applicable for each pavement treatment

When developing the scope for these pavement projects it is important to know which roadway design features, such as centerline rumble strips, curb ramps, utility relocation, guiderail, etc. are applicable for each pavement treatment.

The table below outlines the relevant roadway design features to be considered for all pavement treatments:

Treatment	New Centerline Rumble Strips	Curb Ramps, Ped Button Signal	Utility Relocations	Drainage Repairs	ROW	Guiderail	Sidewalks & Driveways	Roadside Repairs	Complete Streets	Design Exceptions	Tree Removal/Trimming	Cross Slope	Structural Repairs
Thin Surface Treatment Type I (Fog, Slurry, Chip Seals, etc.)	Yes	No	No	No ⁶	No	No	No	No ⁶	No	No	No ⁶	No	No ⁶
Thin Surface Treatment Type II (UTFEC, Micro, Cape Seal, HPTO, etc.)	Yes	Yes	Yes ¹	No ⁶	Yes ¹	No	No	No ⁶	No	No	No ⁶	No	No ⁶
LS Concrete Pavement Repair (Partial/Full Depth repairs, diamond grinding, joint/crack resealing)	Yes	Yes	Yes ¹	Yes	Yes ¹	Yes ⁵	No	Yes	No	No ³	Yes	No	Yes
LS Pavement Resurfacing ("mill 'x', pave 'x' plus one")	Yes	Yes	Yes ¹	Yes	Yes ¹	Yes ⁵	No ²	Yes	No	No ³	Yes	Yes	Yes
Major Rehabilitation	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Type 2 ⁴	Yes	Yes	Yes

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Reconstruction	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Type 1 ⁴	Yes	Yes	
New Construction	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Type 1 ⁴	Yes	Yes	

¹ If necessary to meet Americans with Disabilities Act requirements for projects that are considered alterations by definition of the FHWA. *(See Roadway Design Manual Section 5)*

² Sidewalk repairs as needed

³ Crash Evaluation is done during the Concept Development phase to assess if spot improvements can be done or if a breakout project is necessary as per the Limited Scope Resurfacing procedure.

⁴ As outlined in Design Exception Manual. Type 1 and Type 2 designations are subject to final FHWA approval of the Department's proposed 2017 Design Exception Manual

⁵ Programmatically included, but will be evaluated on a case by case basis with the Guide Rail Replacement Program to logically determine when to upgrade the guide rail

⁶ If during concept development, or a later project phase, a deficiency related to drainage repair, roadside repair, and/or tree removal/trimming and/or structural repair is identified and determined to be a potential safety concern that may pose a hazard to the motoring public, then immediately notify the Regional Roadway Operations division director in Transportation Operations Systems and Support (TOS&S). TOS&S staff will assess the deficiency and determine the need for immediate action.

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