From Planning Through Construction: An Overview of New Jersey Department of Transportation's Integrated Environmental Procedures

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A centralized environmental organization structure, including a newly created project scoping team, integrated policies and procedures, and adequate staffing provide the means for full consideration of environmental issues at all major decision points involving New Jersey Department of Transportation project development and implementation. Results of preliminary environmental screenings are used in making planning decisions and in development of short- and long-range programs. New project starts are "scoped" by the preliminary engineering and environmental units to produce environmentally compatible project proposals that comply with the National Environmental Policy Act and are ready for final design. Environmental project managers play a critical role in integrating services provided by the environmental bureau with other departmental functions. During final design, procedures ensure that environmental commitments are incorporated into project plans and specifications. Environmental reevaluations are done on all projects as a prerequisite to FHWA authorizations for right-of-way acquisition and construction advertisement. Follow-up environmental functions involving environmental construction permits, archaeology salvage, hazardous waste, and noise barriers are carefully coordinated and integrated during design and right-of-way decision making. Environmental Commitment Reports, summarizing all environmental concerns addressed in final project plans, are reviewed with construction personnel before construction. Compliance with environmental specifications is monitored during construction, and follow-up evaluations are performed on the success of environmental mitigation and enhancements.

April 20, 1990, marked a significant milestone for the environmental movement and for transportation. It was the 20th anniversary of Earth Day and the signing of FHWA's Environmental Policy Statement, stressing "the need to fully integrate environmental considerations into agency policies, procedures and decision making" (T. D. Larsen, keynote address, National Conference on Highways and the Environment, 1990). Mainstreaming environmental considerations has become a federal mandate and a challenge for transportation professionals. Obtaining speedy approvals of environmental documents and simply mitigating impacts is no longer good enough. There must be a genuine responsiveness through all stages of program planning and implementation to build and operate transportation systems that consider and incorporate contemporary environmental values. Good environmental documents are not the end result of the environmental process; good projects are. Therefore, the environmental process must be comprehensive and include all stages of project evolution and provide continuous opportunities to incorporate appropriate environmental values. The result should be "transportation facilities that fit harmoniously into communities and the natural environment" (T. D. Larsen, keynote address, National Conference on Highways and the Environment, 1990).

The environmental process must be carefully managed. Because it involves compliance with multitudes of shifting regulatory programs and evolving environmental values, the activities collectively referred to as the "environmental process" must be well integrated and carefully managed to produce good results. The consequences of mismanaging this process can include serious erosion of agency credibility, exposure to successful litigation, unpredictable schedules, and increased project cost.

In the past 20 years, the New Jersey Department of Transportation (NJDOT) evolved its environmental process to include all stages of project planning and implementation. There can be many different ways to successfully integrate environmental considerations into project development and implementation. This paper presents a summary of NJDOT's version and illustrates how the department has prepared itself to meet the rigorous transportation and environmental challenges of the 21st century.

EVOLUTION OF NJDOT'S ENVIRONMENTAL PROCESS

In 1972 the Bureau of Environmental Analysis (BEA) was created as a planning unit. Initially staffed with a handful of professionals, its sole purpose was to write environmental documents mandated by the National Environmental Policy Act of 1969 (NEPA) (P.L. 91-190, January 1, 1970, as amended by P.L. 94-52, July 3, 1975, and P.L. 94-83, August 9, 1975) to obtain FHWA approvals for projects already designed and otherwise ready for construction. After NEPA compliance was achieved, there was little, if any, further involvement by environmental staff during the remaining steps of project implementation.

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The increased restrictiveness of state and federal environmental regulations during the late 1970s, especially involving wetlands, and the need to follow up on environmental commitments made in NEPA documents and environmental permits created opportunities for environmental specialists to assume active roles in construction plan and specification development. Aside from the obvious environmental benefits, the process had another significant value. It marked the beginning of a strong partnership between NJDOT environmental and engineering staff.

By 1988 BEA was assigned lead responsibility for obtaining all environmental approvals, including construction permits. A formal environmental reevaluation process was also implemented, requiring BEA sign-off on every federally funded project before FHWA authorizations for ROW purchase and project advertisement. These two important functions placed BEA directly in the mainstream of project development. Implementation of review procedures for compliance with environmental commitments and permit conditions during and after construction by environmental staff further extended opportunities to incorporate environmental values into the final stages of project implementation. It also fostered a closer relationship between construction and environmental staff.

The recognition that environmental considerations must be fully considered during the earliest stages of program planning and project development, and that only environmentally feasible projects should be pursued, led to the current organization of the environmental function in NJDOT. In addition to providing environmental services during design and construction phases, BEA is now also working with a newly created unit, the Bureau of Preliminary Engineering (BPE), to "scope" new projects. A scoped project has an environmentally compatible preliminary design, all significant environmental approvals, public support, and credible project cost estimate and is ready for final design without the need for additional alternatives analysis.

The term "project scoping" as officially designated in NJDOT policy and used in this paper is different from scoping defined in the Council on Environmental Quality regulations (*1*) involving NEPA compliance. The latter is a technique recommended to solicit early involvement in large projects by other agencies and the public. NJDOT's project scoping process will be described in a subsequent section.

ENVIRONMENTAL STAFF WITHIN THE NJDOT ORGANIZATION

The primary unit for providing environmental services to NJDOT is BEA. It is located in the Division of Project Development, along with BPE, which provides engineering services for project scoping and project location. The division reports to the assistant commissioner of policy and planning as shown in Figure 1. All environmental staff are located centrally in Trenton, within easy travel distance to any work site.

The 67 staff in BEA are organized into three sections: project management, technical, and permits/ecology. Additional field support is provided by 20 environmental professionals located in the Construction and Maintenance Bureau. Figure 2 shows the functions performed by each section of BEA.

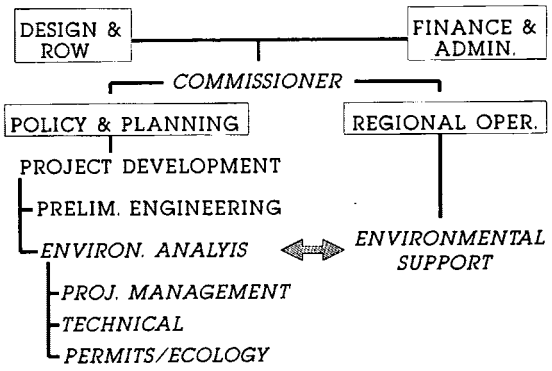

FIGURE 1 Placement of environmental staff in NJDOT organization.

PROJECT MANAGEMENT
- Organized by regions, located in Trenton.
- NEPA & 4(f) document preparation & approvals.
- Project coordination with FHWA and within NJDOT.
- Project schedules, tracking, reporting.
- Environmental 'generalists'.

PERMITS & ECOLOGY
- Organized by regions, located in Trenton.
- Environmental permits & natural resources assessments.
- Permit coordination with agencies.
- Permit schedules, tracking, reporting.
- Environmental 'specialists'.

TECHNICAL
- Organized by technical functions, located in Trenton.
- Section 106 approvals, air, noise, hazmat, contracting.
- Coordinate with agencies & FHWA.
- Schedules, tracking, reporting.
- Environmental 'specialists'.

FIGURE 2 BEA functions by section.

INTEGRATION OF ENVIRONMENTAL CONSIDERATIONS DURING PLANNING, PROJECT DEVELOPMENT, AND PROJECT IMPLEMENTATION

Environmental issues are considered by NJDOT from the earliest stages of transportation planning through project design and construction. To illustrate how this is accomplished, a description of environmental services will be described for each major stage of transportation planning, project development, and implementation. Figure 3 shows these functions.

Public involvement is recognized as an important aspect of NJDOT's environmental process. However, to keep the scope of this paper manageable, details are not provided on the public involvement process here.

PLANNING

NJDOT's planning process includes transportation needs assessments, corridor analyses, air quality planning, and development of the annual transportation improvement plan. Since at these stages the focus is on identifying specific capacity, safety, and operations problems with only conceptual

PROJECT STAGES	ENVIRONMENTAL FUNCTION
PLANNING	✓ SCREEN PROBLEM STATEMENTS
PROJECT DEVELOPMENT	✓ PROJECT SCOPING • Find best "fit" • Establish project cost ✓ ENVIRONMENTAL APPROVALS • EIS • Env. Assessment/ FONSI • Categorical Exclusion
FINAL DESIGN & RIGHT OF WAY	✓ PLAN REVIEWS ✓ ENVIRON. RE-EVALUATION ✓ ENVIRON. PERMITS ✓ CONTAMINATION CLEAN UP SPECIFICATIONS ✓ FINAL NOISE STUDY ✓ ARCHAEOLOGICAL SALVAGE
CONSTRUCTION	✓ MONITOR COMPLIANCE WITH ENVIRON. COMMITMENTS
MAINTENANCE	✓ MONITOR EFFECTIVENESS OF ENVIRONMENTAL MITIGATION

FIGURE 3 Environmental functions during stages of project development and implementation.

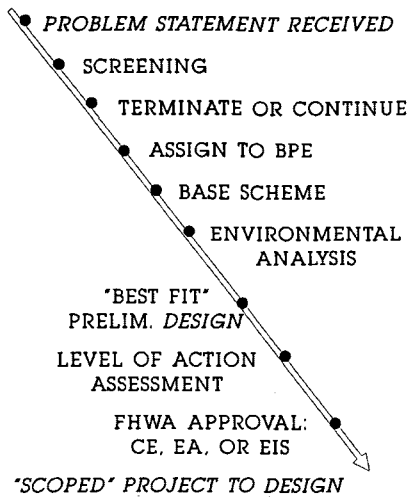

FIGURE 4 NJDOT's project scoping process.

recommendations for improvements, detailed environmental information, with the exception of air quality planning, is generally not required. At this stage, only broad-based screenings of environmentally sensitive areas are done to generate information for planning decisions. The culmination of the planning stage is problem statements, which articulate transportation deficiencies with conceptual recommendations for improvements.

PROJECT DEVELOPMENT AND PROJECT SCOPING

The concept of project scoping is the newest significant aspect of the NJDOT project development process. It is an organizational and procedural arrangement that integrates environmental analysis with preliminary engineering to produce environmentally feasible project proposals.

To address environmental issues at the earliest stage of project conception and development, BPE was created in 1990 and, working together with BEA, the process of project scoping was initiated. Figure 4 shows the process. A brief explanation follows.

Problem statements, which include detailed information on transportation needs, are submitted to the Division of Project Development from planning for a preliminary screening. BPE and BEA do a quick screening of broad engineering and environmental issues for obvious constraints that may affect feasibility. Environmental information is provided in a four-page preliminary environmental screening form and used, with input from other units, by senior management to decide whether the problem statement should be developed further into a capital project or the effort should be terminated.

If a decision is made to continue development of a project, BPE, staffed with civil engineers, develops the initial project footprint, which provides maximum transportation service, unconstrained by environmental factors. These conceptual engineering sketches, showing boundaries of potential land disturbance and property acquisition, along with field information, photographs, and video film are provided to BEA staff. At this point a detailed environmental analysis is done to identify all environmental constraints and opportunities for enhancement. Using this information, preliminary engineering staff and environmental staff develop an optimum project concept with minimal environmental impacts but providing acceptable transportation service. Alternatives analysis is done at this stage to the extent required to find the "best fit," and the results are documented in a level of action (LOA) assessment.

The LOA assessment is a key aspect of NJDOT's project scoping process. Codified in the department's policies and procedures, it is a minienvironmental assessment, which addresses the full range of potential environmental impacts. It includes input from not only BEA but also Right-of-Way, NJ Transit, external affairs, and design units and is used as supporting documentation by FHWA to classify projects into the categorical exclusion, environmental assessment, or EIS category. It also includes a comprehensive listing of all environmental approvals and permits needed to implement the project as well as any special commitments to address specific environmental issues in the final plans and specifications. Finally, it also includes a plan for implementing an appropriate community involvement program. To preserve the option for federal participation, all projects are subjected to LOA assessments and presented to FHWA for concurrence.

To obtain FHWA approvals on recommendations to classify project proposals as categorical exclusions, the LOA as-

sessment must demonstrate compliance with Section 106 of the Historic Preservation Act of 1966 and Section 4(f) of the DOT Act of 1966. Reasonable assurance must also be provided that the project will comply with all other environmental statutes. FHWA approval of an LOA assessment for projects categorically excluded from NEPA constitutes NEPA signoff. If it is clear from the preliminary screening that the project proposal will need an EA or an EIS, considerably less detail is included in the LOA assessment, since the EA or EIS will comprehensively address all relevant environmental requirements as well as public involvement. The LOA in these cases is simply used as support for decisions on classifying projects into the EIS or EA categories.

The larger projects classified as EAs or EISs remain under the lead of BPE. Development of these documents, although an interesting and complex process, is not covered here. It is sufficient to point out, however, that the "NEPA process" involving iterative engineering and environmental effort is conducted within the same NJDOT division to find the best environmental fit for projects. All capital projects need an LOA assessment to get FHWA authorization for funding of final design and right-of-way acquisition. All projects must go through BEA for this assessment with the exception of a small group of categories that do not involve any additional ROW or significant disturbance of land. In these cases, although an LOA is still needed, the lead engineering units process it directly, without BEA input.

The products of the project scoping process are project proposals that have FHWA approval for compliance with the provisions of NEPA, Section 4(f), and Section 106; are likely to receive environmental permits; and have realistic cost estimates and predictable implementation schedules (*2,3*). In other words, scoping produces feasible project proposals ready for inclusion in a well-defined and "deliverable" annual capital program for final design, right-of-way, and construction.

As shown in Figure 3, the preliminary engineering plans of scoped project proposals are transferred to final design unit for 30 scale plan development, right-of-way acquisition, and specification development. A key element of this project handoff is the transfer of specific environmental commitments made during the categorical exclusion and NEPA document approval processes.

FINAL DESIGN PROCESS

Scoped project proposals are assigned to the appropriate final design unit and the development of 30 scale project plans and specifications begins. At this point, proposals are given project status and are included as line items in annual capital construction programs for final engineering, right-of-way, and construction funding. With this also comes a more acute focus on tracking project schedules and cost.

NJDOT has a four-phase plan development process, with the fourth phase being final plans and specifications used for bidding. During these stages, important environmental functions continue to be performed by BEA.

To ensure that commitments addressing environmental concerns identified during the scoping process are included in the final project plans and specifications, a checklist, known as the Environmental Commitments Report, is provided to the designer. This document also tracks the need for and status of all subsequent environmental permits and approvals required before advertisement. Examples include floodplain, wetlands, and water permits. This checklist is circulated with each phase of plan development and updated by design and environmental staff as new information develops. At each of four stages of plan development, procedures require reviews by BEA staff to keep track of design changes that may require additional environmental analysis and to suggest ways to enhance the environmental compatibility of the project.

Environmental permits are obtained by BEA staff during final design. The lead design units provide the required engineering information to BEA permits/ecology staff, who then add the required environmental data to complete permit applications. BEA staff are responsible for negotiating with permit agencies and are accountable for maintaining schedules. Permit conditions, including mitigation plans, special design features, and best management practices are added to the environmental commitments report for future tracking. The manager of BEA attends monthly meetings among senior NJDOT and New Jersey Department of Environmental Protection and Energy (DEPE) management to resolve problems involving policy interpretation, project priorities, and new initiatives.

Another significant function by BEA during the final design process is the environmental reevaluation, codified in NJDOT's official policy manual. It was developed in response to an initiative by the New Jersey division FHWA office to address the reevaluation provisions of 23 CFR, Part 662, Section 771.129. Since the property acquisition and completion of the final plans may occur several years after project scoping and NEPA approvals, the intent is to make sure significant changes in project design, right-of-way, public reaction, and environmental impact (including those resulting from new programs) are addressed before federal authorizations are given for right-of-way acquisition and project advertisement. The environmental reevaluation is performed on all projects by BEA staff and approved by the BEA manager. Federal authorization is not given without this sign-off. If significant changes are identified, appropriate steps are taken, including additional environmental assessment, to bring the project back into compliance. The reevaluation for advertisement must include copies of all necessary permits and approvals. The substantive issues addressed by the reevaluation form are shown in Figure 5.

During the final design process, environmental staff develop detailed DEPE-approved soil contamination remediation plans and specifications that are included in project plans and specifications. This information is also made available to right-of-way staff for use in property appraisals, negotiations, and, if necessary, condemnation proceedings. Environmental staff provide continuous technical assistance and expert testimony through the conclusion of the property acquisition process. Since the department policy is to try to get owners to remediate contamination before property acquisition or recover cleanup expenses from those unwilling to do so, the availability of environmental staff expertise is critical to success in these endeavors.

To ensure that right-of-way staff are aware of all environmental features on proposed ROW parcels that may affect appraisals, negotiations, settlements, and condemnations, BEA staff identify environmentally sensitive parcels on right-of-

ENVIRONMENTAL REEVALUATION

DONE AFTER "NEPA"...
FOR ROW AUTHORIZATION...
FOR CONSTR. AUTHORIZATION

1. HAVE ALL PERMITS?
2. PROJECT SCOPE CHANGE?
3. SIGNIFICANT LAND USE CHANGES?
4. NEW LAWS, REGULATIONS?
5. CHANGE IN PUBLIC SUPPORT?
6. NEPA ENVIRONMENTAL COMMITMENTS IN PLANS/ SPECS?
7. PERMIT CONDITIONS IN PLANS AND SPECS?
8. DOES ANY "ANSWER" CHANGE NEPA DOCUMENT CONCLUSION?

FIGURE 5 Environmental reevaluation checklist.

way plans that include wetlands, contamination, parkland, or other constraints that require special consideration or special procedures.

Other environmental activities that run concurrently with final design include archaeological salvage, historic structure mitigation (relocation, archival recording, etc.), wetland mitigation plan development and agency approval, and preliminary noise barrier design. Environmental staff make a significant effort to fit these functions in the design process at the appropriate time, to ensure a smooth process.

The final involvement by environmental staff during the design process (or beginning of the construction stage) is the handoff of environmental information to the resident construction engineer, construction's environmental support staff and contractor. The environmental commitments report is provided and discussed at a preconstruction conference. The intent is to carefully explain the significance of environmental protection and enhancement features and emphasize the need for resident engineers to ensure contractor compliance.

CONSTRUCTION AND MAINTENANCE

During construction, regular field checks are made by Environmental Support Services staff (see Figure 1 for relationship to BEA) and BEA during sensitive stages of construction to check for compliance with environmental requirements and provide assistance to construction staff. Day-to-day environmental field services are also provided by the Environmental Support Unit, including water quality sampling, erosion control, and technical assistance to resident engineers on implementing environmental specifications. Field information is supplied to BEA staff, who provide general oversight for environmental compliance and reporting to FHWA. BEA also obtains permit modifications as field conditions warrant and provides technical assistance in resolving violations of permit conditions by contractors.

After construction is complete, BEA is responsible for monitoring and reporting on the success of wetland mitigation projects to regulatory agencies for 3 to 5 years. Other environmental follow-up activities, such as groundwater monitoring of remediated contaminated sites and archaeology data recovery reports, are also performed by environmental staff during this late stage.

Occasionally, the long-term effectiveness and maintenance characteristics of environmental project features are also evaluated with assistance from environmental staff. Examples include oil/water separator devices and water quality treatment features of drainage systems.

ENVIRONMENTAL PROJECT MANAGER

A discussion of NJDOT's integrated environmental process is not complete without a description of the role of the environmental project manager. The environmental bureau is split into two generalized functions, specialists and project management. Specialists in a wide range of professional disciplines, many with advanced degrees, provide in-depth skills and knowledge needed to conduct and direct technical studies, which are the basis for environmental documents and project decisions. These professionals are located in the technical and permits/ecology sections of BEA.

Environmental project managers (who include environmental permit managers), organized into four regions, homogeneous with design, construction, and maintenance regions, serve as the "integrators" of specialist functions into the mainstream transportation development process. Although most of these professionals have environmental degrees, they serve as generalists. All projects requiring environmental service by BEA are assigned to project managers, who coordinate project scoping efforts; prepare LOA assessments, 4(f) documents, NEPA documents, and environmental reevaluations; review design plans, and audit compliance with environmental commitments during construction. These managers coordinate environmental services and track their assigned projects from the earliest scoping stages through construction and beyond. The most important functions of environmental project managers, however, involve a strong responsibility for project "ownership" manifested through environmental advocacy, accountability for compliance with environmental regulations, and environmental functions that are kept on schedule, within cost, and integrated with the efforts of other functional units in NJDOT from early planning through construction (see Figure 6). They coordinate bureau efforts with FHWA, lead engineering and support units in the department, attend virtually all program status meetings, and represent the bureau at public meetings and hearings. The environmental project managers also maintain a comprehensive and current computer data base on the status of environmental services on all projects. Used to generate regular status reports distributed to all concerned units, the data base is also extremely helpful in developing and evaluating project lists for annual capital construction programs and for diagnostic purposes.

This arrangement encourages environmental professionals to formulate a comprehensive and intimate view of the department's mission and operations and discourages the propensity for viewing environmental functions as an assembly line "add-on" exercise. It encourages staff to think in terms of physical projects and services, reinforcing the fact that good

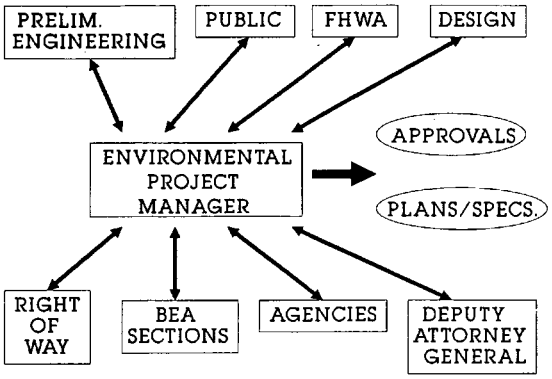

FIGURE 6 Environmental project managers integrate and coordinate efforts to obtain environmental approvals and ensure development of environmentally enhanced construction plans.

projects and good operational practices, not simply good environmental documents, are the ultimate goal of the environmental process.

CONCLUSION

NJDOT's environmental functions in 1993 are no longer limited to obtaining NEPA compliance for projects, as they were in 1973. All aspects of department operations must now be in compliance with the myriad of state and federal environmental statutes and the public's expectations. In 20 years, the role of NJDOT environmental staff has dramatically increased in significance, affecting virtually all aspects of department operations, especially capital program development and execution.

NJDOT's organizational structure, procedures, and staffing now provide continuous opportunities to incorporate contemporary environmental values at virtually all stages of transportation planning and implementation. The arrangement also provides excellent control over program compliance with environmental laws and regulations, resulting in consistent delivery of annual capital programs.

The newly created process of project scoping has already been effectively used to reevaluate several long-standing, environmentally infeasible projects, resulting in decisions to terminate them. It has also been used effectively in quickly determining feasibility of major controversial transportation proposals, which in years past would have languished as multiple iterations of feasibility studies lasting decades.

Since the project scoping process is only about 2 years old, the track record is still under development. It is anticipated that the next few years will produce evidence that scoped projects will proceed through the final design process and receive environmental permits on a faster, more predictable track and will be better accepted by the public and environmental agencies.

A significant challenge remains for NJDOT. The Intermodal Surface Transportation Efficiency Act provides unprecedented opportunities to make transportation part of the environmental solution. The department's organizational infrastructure is well established to fully incorporate environmental values in program development and execution. NJDOT environmental professionals, planners, and engineers must now learn to better recognize opportunities to enhance the environment and take full advantage of NJDOT's integrated process to act on them. The standard of environmental success should reach beyond good environmental documents and speedy environmental approvals. Good projects and well-run transportation operations that reflect contemporary environmental values will be the standard for success in the 21st century.

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