Georgia Department of Transportation
Office of Environmental Services
Environmental Procedures Guidebooks

Environmental Analysis
Need & Purpose

APPLICABILITY

A Need & Purpose (N&P) establishes the basis for the transportation project—why it is needed and how it will address the need. Although N&P documentation is necessary for all projects, the scope of the documentation generally corresponds to the scope of the project. For minor projects, only a N&P statement may be produced, and for very minor projects, such as maintenance and signal upgrades, the N&P may be folded into the project description. What one would consider a N&P "document"—a written narrative with data, analysis, contextual information, and project history—is typically reserved for major and mid-scale projects.

Unless otherwise stated, the phrase N&P as used in this guidance refers to the larger and more complex version of a N&P that is prepared for mid-scale to major projects. It is these N&Ps which the Environmental Analyst will most often be challenged to work with, refine, and incorporate into other documents—in particular National Environmental Policy Act (NEPA) documents.

The N&P serves a variety of functions, but its critical role is to establish the range of reasonable alternatives to be considered during Concept Development. Accordingly, this guidance gives special attention to the place of the N&P in the Alternatives Analysis.

REGULATIONS, GUIDANCE, AND POLICY

Although prepared for state-funded projects with no federal action, N&Ps are most important on projects that involve a federal action. This is because when a federal action is involved, the federal agency taking that action assumes legal responsibility for the Alternatives Analysis. The responsibility is twofold. First the agency must ensure that that the N&P is strong enough to warrant choosing a build alternative over the no-build alternative. Then, if a build alternative is chosen, the agency must ensure that it achieves a balance between meeting the N&P and avoiding and minimizing environmental impacts.

Federal actions on GDOT projects generally fall into two categories:

Authorization of Federal Funds – Although many GDOT projects are exclusively state-funded, most receive federal funds for right-of-way (ROW) acquisition and/or construction. Usually the federal agency providing these funds is the Federal Highway Administration (FHWA). Hence, FHWA bears ultimate responsibility for the N&P on most GDOT projects.

Issuance of Federal Permits – The most common federal permits needed for GDOT projects are Section 404 of the Clean Water Act (CWA) Permits that authorize impacts to Waters of the US. The US Army Corps of Engineers (USACE) is the federal agency with authority to issue these permits, and, by virtue of this authority, must exercise oversight of the N&P.

Coordination with FHWA and USACE concerning these actions is influenced by numerous federal laws. Three are especially important to the N&P: NEPA; Section 404 of the CWA, and Section 4(f) of the US Department of Transportation Act.

National Environmental Policy Act

NEPA is an umbrella law that encompasses a wide range of environmental laws. It requires that federal agencies consider environmental consequences when developing their projects and programs. NEPA also requires that the agency taking the federal action issue a public environmental document to disclose the environmental impacts of the project and justify those impacts in terms of the action's N&P.

For federal-aid projects, GDOT prepares the NEPA document for FHWA, and either submits the document to FHWA for approval or approves it internally on behalf of FHWA per a Programmatic Agreement. Depending on the project's scope and potential environmental impacts, three NEPA document types are possible. These document types will be discussed and distinguished shortly, but it is worth noting that higher level NEPA documents typically entail more complex N&Ps.

For the issuance of Section 404 Permits, NEPA compliance is the responsibility of the USACE. The type and level of document will vary depending on project impacts and the type of permit required.

Section 404 of the Clean Water Act

Section 404 of the CWA gives the USACE permitting authority over impacts to Waters of the US. Although the N&P must be documented for any type of Section 404 Permit, documentation is critical on projects requiring a Section 404 Regional General Permit (RGP) 35 or an Individual Permit (IP). For these projects, the N&P is used to conduct the Practicable Alternatives Review (PAR). Through the PAR, USACE, GDOT, and other ecological resource agencies consider a range of alternatives to avoid and minimize impacts to Waters of the US.

On federal-aid projects that require a Section 404 Permit, the USACE will cede lead-agency authority to FHWA and adopt the role of a consulting agency. As a consulting agency, the

USACE may raise concerns about the N&P as it pertains to the issuance of the 404 Permit, and FHWA will consider these concerns closely.

On state-funded projects requiring a Section 404 Permit, the USACE assumes the role of lead federal agency. In that role, the USACE must ensure compliance with all the laws falling under the NEPA umbrella and must evaluate the N&P in this broader context.

Section 4(f) of the US Department of Transportation Act

Applicable to all federal-aid projects, Section 4(f) of the US Department of Transportation Act requires an analysis of avoidance alternatives for adverse uses of property from public parks and recreation areas, public wildlife and waterfowl refuges, National Register of Historic Places (NRHP) listed or eligible historic properties, and NRHP listed or eligible archaeological sites that warrant preservation in place.

The N&P is critical when an adverse Section 4(f) impact is involved. In such cases, the N&P must be strongly supported to justify the Section 4(f) impact, and some avoidance alternatives may be rejected because they would not adequately meet the N&P. Section 4(f) Evaluations undergo rigorous review by FHWA, including a legal sufficiency review by FHWA attorneys.

COMPONENTS OF THE NEED & PURPOSE

A fully developed N&P will have some or most of the components discussed here.

The Need (Evidence of a Problem)

The "need" element in the N&P demonstrates that there is a transportation problem whose severity warrants the project. The need should be measurable. Hence, if the primary problem is congestion, the N&P might measure congestion with no-build condition level-of-service (LOS) grades. Grades such as E or F, which indicate high levels of congestion, would demonstrate that there is a congestion problem. Table 1 defines LOS.

It is important to emphasize that projects can, and usually do, address more than one transportation need (problem). For example, most congestion relief projects will have crash reduction as a secondary need.

Table 1 – Level-of-Service Definitions

LOS	Definition
A	Volume is well below capacity and traffic is flowing freely.
B	Volume is steady, the presence of other vehicles begins to be noticeable.
C	Steady traffic flow, speeds and maneuverability are more closely controlled by traffic volumes.
D	Approaching an unsteady flow in which speed and maneuverability are severely restricted.
E	Traffic flow is reduced to a slow but relatively uniform speeds, and traffic volume is equal to or nearly equal to capacity and maneuverability is extremely difficult.
F	Volume greatly exceeds the capacity and lengthy delays occur.

The Purpose (Positive Outcome)

The "purpose" dimension of a N&P offers positive goals or outcomes that will address the identified transportation problems. Ideally, outcomes will be measurable and minimum performance standards will be identified. For example, given a need for congestion relief, LOS might be the "measure" and LOS C the "minimum goal."

The advantage of measurable goals and objectives is that they can help narrow the range of alternatives. Alternatives that fall short of the threshold that defines the positive outcome are dropped from further consideration. Yet, despite this advantage, performance goals face two limitations. First, and as will be discussed shortly, quantifiable measures of effectiveness are difficult or impossible to establish for some N&Ps. Second, desired performance goals may sometimes be unachievable due to environmental or other constraints.

Project History

A strong N&P should tell the story of the project: how it originated during the planning process and how it developed through the Concept Stage.

Logical Termini

For capacity-adding projects, the N&P must include an analysis of logical termini. Logical termini is a complex topic that presents some challenging conceptual and measurement problems. It is also the N&P component that may require the most consideration from the Environmental Analyst. For these reasons, a separate Environmental Procedures guidebook is devoted exclusively to logical termini.

Other Components

The N&P may discuss nearby system linkages, modal interrelationships, social demands, economic development, legislation, and other topics as applicable.

DEVELOPMENT OF THE NEED & PURPOSE

The development of the N&P begins in the planning phase and continues throughout the Concept Stage. The following discussions trace N&P development with a focus on the Environmental Analyst's involvement. The N&P will be refined as the project advances through the Concept Stage. However, the N&P should not change fundamentally. Also, it should never be altered to fit a preferred alternative. The N&P should drive the alternatives development, not the other way around.

Project Justification Statement

The N&P has its genesis in the GDOT planning process. The process allows local and regional governments, local public agencies, and local stakeholders to identify transportation needs in their areas of the state. If the outcome of the planning process is a programmed project, the discussion of its N&P is found in a Project Justification Statement (PJS). Provided by the Office of Planning, the Office of Bridge Design, or the Office of Traffic

Operations, the PJS is developed before the schedule at the outset of Concept Development.

The PJS should focus on the transportation need or problem; it should not assume a particular solution. It identifies and explains the major issue, or issues, that the project should address. It should list any designated program, or programs, that include the project. It should describe how the project originated, explain the proposed project limits, and identify the project's performance goals. For very minor projects, the PJS will be a statement. For mid-scale to major projects, it will be a report and may include no-build condition data, including traffic, LOS, and crash statistics.

Draft and Final Concept Report

The next document to address the N&P is the Draft Concept Report. Issued by the Design Office, the Draft Concept Report takes the PJS, with its statement and indicators of "need," and adds the "purpose" element—i.e., a proposed build alternative with accompanying goals and objectives (measures of effectiveness). For major projects, several alternatives are usually included in the Draft Concept Report. At this stage, they will have undergone a preliminary screening for performance and for potential environmental impacts. Typically, one of these alternatives will be designated as "preferred."

Between the Draft Concept Report and approval of the Final Concept Report, the N&P may undergo further refinements. Often these refinements will originate with the Environmental Analyst who will identify problems or gaps in the N&P or its data. To work through these problems, the Environmental Analyst will need the help of other project team members, such as the Transportation Planner, the Project Manager (PM), the Design Manager, and the Traffic Engineer. Assistance from agencies outside of GDOT, such as local and regional planners, may also be needed. And, for federal-aid projects, FHWA is always the final arbiter of N&P concerns. Formal coordination with FHWA on the N&P is required on projects requiring an Environmental Assessment (EA) or Environmental Impact Statement (EIS). The vehicle for this coordination is the preparation and submission of a Need, Effectiveness, and Logical Termini (NELT) document for FHWA concurrence.

The types of N&P concerns to require revisions and additional information are wide ranging. To address these concerns, the Environmental Analyst should keep three basics in mind.

1. The N&P must include solid information. The information must be analyzed rigorously, and the author should draw logical conclusions from it.

2. The N&P must not oversimplify matters or paint a one-sided picture that ignores gaps and inconsistencies that require qualifying conclusions. Available data and methodologies are seldom so strong as to leave absolutely no doubt about a N&P or an alternative. By acknowledging information problems and offering caveats where appropriate, the N&P will have a stronger, more balanced analysis.

3. The Environmental Analyst should use caution when including performance goals in the N&P. Concept Reports do not usually cite performance goals, and the Environmental Analyst should coordinate with the PM before inserting them into a N&P. Designers may not have approached alternative development with a performance goal in mind, and the N&P should not include a performance goal unless it was specifically used for alternative development.

Common Concerns

The following are some specific problems that may prompt the Environmental Analyst to consider revising the N&P in the Draft Concept Report.

Too Many Objectives – The N&P can sometimes include too many narrowly defined problems and objectives. For example, "improve congestion management," "maximize efficiency of the corridor," and "reduce traveler delay" would seem to be dividing one objective—all involving congestion relief—into three. When a N&P is so divided, it becomes difficult to analyze each objective independently of the others.

When multiple objectives are present in the N&P, the Environmental Analyst may need to rank them in importance based on the strength of their supporting data and information. Some may need to be designated "primary" and others "secondary." Crash reduction, for example, will need to be demoted if crash rates, fatality rates, and/or injury rates are below statewide averages.

Too Broad – N&Ps can be too broad or abstract. In the example cited above, what does "maximize efficiency of the corridor" really mean? The idea is so broad and abstract as to carry little substantive meaning, and the author would do better to translate it into one or more concrete and measurable objectives.

Omissions – Although rare, objectives may sometimes have been omitted from the N&P and will need to be added by the Environmental Analyst. For example, given a major widening project for which the primary need is congestion relief, the NEPA Analyst may notice that build condition LOS is only marginally better than no-build condition LOS and that this is because traffic volumes are higher under the build condition (essentially capacity increases are being offset by traffic increases). Conferring with the Traffic Engineer may reveal that the reason for the added build condition traffic is that the project is meeting a latent demand for increased travel on the corridor, i.e., motorists that have been induced to use alternative routes by high congestion on the corridor will be induced to return to the corridor once the route is widened. Upon receiving this information, the Environmental Analyst will want to add "meeting latent demand" as another N&P objective. And, since drawing traffic from alternate routes will improve operations on those routes, the Environmental Analyst can buttress the N&P by citing "congestion relief" on these routes as a benefit, if not an objective, of the project.

Contradictions – Basic conflicts between the N&P and supporting information may need to be reconciled. For example, an economic development N&P may be accompanied by

projections of high traffic growth and degrading LOS under the no build condition. While such projections would support a N&P of congestion relief, they run counter to an economic development N&P because they suggest that economic activity and development will occur even without any stimulus from the project. Such fundamental conflicts arise infrequently, but when they do, the N&P needs to be revisited with the Office of Planning.

Addressing Concerns

As these examples suggest, the Environmental Analyst should not view the N&P in the Draft Concept Report as a final product. Looking for gaps or inconsistencies in the data and information contained in the report is crucial. Identifying N&P problems early and working through them will ensure that the project advances on schedule.

For EA and EIS projects, it is required that a NELT Form be submitted to FHWA early in Concept Development to gain the agency's concurrence with the N&P.

Refinements and evolutions in the N&P should come to a halt when the Final Concept Report is approved and, conversely, the Concept Report should not be approved until any and all revisions necessary to strengthen and clarify the N&P have been made.

Types of Need & Purpose

There are a variety of transportation N&Ps. This section examines some of the most common, noting variations in data requirements and frequent problems.

Congestion Relief

Congestion relief is often the primary N&P for major projects requiring a fully developed N&P. Usually the preferred alternative will either widen the roadway—to increase the capacity of the congested route—or, less frequently, build a new location facility—to remove traffic from it.

No-build condition LOS grades typically identify the transportation problem defined by the congestion relief N&P. An acceptable build condition LOS is the primary performance goal. For most corridors, LOS D-F on rural routes and LOS E-F on urban routes indicate the need for congestion improvements. The N&P would typically define a performance goal of LOS C or better on rural routes and D or better on urban routes.

On many urban routes, where LOS D is not achievable without causing significant community disruption or environmental impacts, the performance of an alternative may be deemed acceptable if it provides a substantial improvement in congestion over no build condition—perhaps raising LOS from F to E or, perhaps, if not raising LOS above LOS F, at least providing a better level of F (e.g., reducing intersection delay from 300 seconds to 150 seconds or increasing road segment speed from 20 mph to 26 mph).

Other measures of congestion and traffic delays, such as throughput, travel time, etc. are available and may be used if LOS does not seem to adequately capture all dimensions of the congestion problem.

Safety and Crash Reduction

Safety is the primary N&P for many minor and mid-scale projects, particularly intersection improvements, and it is typically a secondary need on major widening projects. GDOT collects raw crash data for corridors and calculates rates for crashes, injuries and fatalities for corridors. These rates are generally the measure of need, and corridor rates that are significantly higher than statewide rates for the same type of facility will demonstrate a strong need for safety improvements.

Demonstrating that a project will achieve the "objective or purpose" of reducing crashes can be more difficult than proving need. There is no computer program that generates quantitative predictions of future crash rates, so it will be impossible cite a performance goal such as a crash rate of 1.00 and to predict how closely the project will come to reaching that goal. For some types of improvements, such as medians, the N&P can cite national research showing that the improvement generally reduces crash rates. But absent such research, the N&P will need to rely on qualitative information obtained from the project team to explain how and why a certain type of design improvement will be effective for improving safety.

Reliable Trip Times (Express Lanes)

The primary N&P for express lane projects is to ensure reliable trip times for motorists choosing to use the lanes. Secondary benefits are usually cited as well. These include encouraging the use of transit by allowing buses to use the express lanes and the reduction of congestion in general-purpose lanes owing to increased bus ridership and the reassignment of some general-purpose lane traffic to the express lanes.

The indicator of a transportation problem for express lane projects is high congestion and, perhaps, high accident rates in the general-purpose lanes. Taken together these problems make travel times unreliable. The effectiveness of express lanes for providing reliable trip times is guaranteed by congestion-based pricing, which allows the toll rate for using the lanes to vary with demand, thus matching traffic volumes to capacity and enabling the lanes to operate at a minimum speed of 45 mph even during peak hours and even when there is an accident in the general-purpose lanes.

Effectiveness for achieving the secondary N&P of improving congestion in the general-purpose lanes can be demonstrated by build condition LOS grades, which, though they may not reach the desired level of D or better, will usually represent an improvement over no-build condition grades. National research showing that express lanes generally increase bus ridership would demonstrate or predict effectiveness for that secondary need.

Correcting Design Deficiencies

"Correcting design deficiencies," e.g., substandard geometrics or load limits, inadequate cross-sections, etc., should not be cited as a N&P. Such improvements are not made for their own sake, but rather for their benefit to the traveling public. With that in mind, the N&P for correcting design deficiencies will usually be improved safety and traffic operations.

System Linkage and Connectivity

A project may potentially link or connect transportation facilities, modal facilities, geographic areas, regional traffic generations, or any combination of the above. The North Carolina Division of FHWA cautions that system linkage is rarely the primary N&P of a project—"that usually there is an underlying need, and linkage is simply a way of addressing it."[1] The same can probably be said of connectivity. This concern aside, system linkage and connectivity sometime appear as N&P objectives on GDOT projects—especially on major projects such as Express Lanes that are part of a planned system. Traffic analysis showing that large volumes of traffic will utilize the linking route would probably lend support to this N&P, but per the North Carolina Guidance, the NEPA Analyst should consider whether connectivity and linkage are addressing more fundamental underlying needs.

Economic Development

Projects may have economic development as a primary or secondary N&P. Some economic development projects are state initiatives and other local ones. At the state level, the most prominent economic development projects are part of the Governor's Road Improvement Program (GRIP), a network of widening projects intended to stimulate economic development in rural areas of the state. Locally sponsored projects are often in rural counties also, especially in areas that are economically depressed.

Economic data is critical for demonstrating the N&P for economic development. Such data may include high poverty rates and high unemployment rates at the local or county level. Transportation measures, such as no-build condition LOS, are largely irrelevant for economic development objectives and needs; though, in the case of GRIP, the fact that the corridor is part of the GRIP network should be emphasized in the N&P.

Demonstrating that a project will be successful for spurring economic development can be challenging. In the case of GRIP, the Environmental Analyst may cite a University of Georgia (UGA) study[2] which shows that counties with widened GRIP corridors experience faster economic growth. For any economic development objective, the Environmental Analyst will have to rely on qualitative information to demonstrate effectiveness. Local and regional planners will often be the primary sources of supporting information. They may have reasons for thinking the project is likely to succeed in promoting development. Such arguments may cite the local government's efforts to market the project corridor and documented interest from developers and businesses.

In the case of economic development, there is one transportation variable that can either support or undermine an effectiveness argument. This variable is traffic projections for the

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[1] *Purpose & Need Guidance for FHWA-funded Projects in North Carolina*. Federal Highway Administration, North Carolina Division. 2009.
[2] Humphreys, Jeffrey. *A Study of the Economic Benefits of the Governor's Road Improvement Program (GRIP)*. Terry College of Business, The University of Georgia. 2003.

design year (20 years after the project opens). Effectiveness is supported when build condition traffic volumes are higher than no build condition volumes, since one would expect economic development to spur traffic growth. Effectiveness receives little or no support when build condition projections are no higher or only marginally higher than no-build condition projections. In the latter situation, the Environmental Analyst should consult with the Traffic Engineer to determine what economic assumptions went into the traffic model.

DOCUMENTATION

In addition to Concept Reports, the N&P is a standard discussion in other GDOT documents. Several of the most important are discussed below.

Need, Effectiveness, and Logical Termini Form

The NELT form analyzes and supports the various components of the N&P, including logical termini. It is required for all EAs and EISs. The form should be submitted as early in Concept Development as possible.

Scope of Analysis

For state-funded projects requiring a Section 404 permit, GDOT submits a Scope of Analysis (SOA) to the USACE to establish the Area of Potential Effect for cultural resources related to the permitted action. The SOA includes a brief N&P statement.

Practicable Alternatives Review

For projects requiring a Section 404 RGP 35 or a Section 404 IP, a PAR is required. The PAR analyzes possible build alternatives, giving attention to the avoidance and minimization of impacts to jurisdictional waters. The N&P is required in PAR documentation, because the alternatives are evaluated based on their ability to meet the project's N&P. Avoidance alternatives that do not meet the N&P do not advance for further consideration.

Section 404 Permits

For federal-aid projects, Section 404 permits adopt the NEPA documentation approved by FHWA, which includes a N&P discussion. For state-funded projects where the USACE is the lead federal agency, a N&P statement needs to be included in the permit request. For projects requiring a PAR, the permit uses the N&P from the PAR.

Section 4(f) Evaluation

For projects taking land from Section 4(f) properties and determined to have an adverse impact, a Section 4(f) Evaluation must be prepared and approved by FHWA. This evaluation must demonstrate that no feasible and prudent alternative exists that avoids greater than *de minimis* uses of Section 4(f) properties. A Section 4(f) Evaluation may be prepared as part of a NEPA document, or it may be developed as a stand-alone document. Either way it must include the project's N&P to support its Alternatives Analysis discussion.

NEPA Documents

On federal-aid projects, the Environmental Analyst prepares the NEPA analysis on behalf of FHWA and either submits it for FHWA approval. Or, for minor projects, OES approves it on behalf of FHWA. There are three levels of NEPA document. The project type and its potential for environmental impacts determine the appropriate document level.

Categorical Exclusions

Most NEPA analyses developed through GDOT are Categorical Exclusions (CEs). By agreement with FHWA, minor CE projects that have minimal or no environmental impacts and can be approved by GDOT on behalf of FHWA as Programmatic Categorical Exclusions (PCEs). Because PCE projects are minor, the N&P statement is usually blended into the project description.

If the CE-level project does not qualify for the PCE Agreement, a CE is prepared and submitted to FHWA for approval. The CE includes a N&P and an Alternatives Analysis—both of which are presented very early in the document. If other build alternatives were considered and dismissed, they must be discussed in the CE. If any of the dismissed alternatives would have lesser environmental impacts than the preferred alternative, the analysis must demonstrate that their dismissal was justified. Usually, failure to meet minimum performance standards or excessive cost will be cited to justify higher environmental impacts.

Environmental Assessments

Environmental Assessments (EAs) are prepared for projects when the significance of environmental impacts is uncertain; this includes most major widening and new location projects, as well as some smaller scale projects which, for some reason, perhaps because they take place in an environmentally sensitive area, have the potential for significant environmental impacts. Like CEs, EAs have a N&P and an Alternatives Analysis discussion early in the document. These discussions tend to be larger and more detailed than in CEs owing to the scale of the project, its potential impacts, and the range of alternatives considered.

Environmental Impact Statements

Environmental Impact Statements (EISs) are prepared for projects with significant environmental impacts. N&P development for EISs involves more coordination and consultation. Early in EIS development, GDOT coordinates with FHWA to notify the public and other affected government agencies of GDOT's intentions. This is the Notice of Intent (NOI). The NOI provides an N&P statement as well as a description of the proposed project, possible alternatives, and a discussion of proposed scoping meetings (public outreach meetings and meeting with agencies).

According to federal regulations, the lead federal agency (GDOT acting through FHWA) is responsible for developing the N&P statement. However, the agency must provide opportunities for input in the N&P from participating agencies and the public. Usually, a

draft N&P is presented at the scoping meetings for consideration by the public and other agencies.

EIS documents include a section to thoroughly detail the N&P. As with EAs, it is usually the first section of the document. The EIS N&Ps are similar to those for N&P in EAs and NELTs, but they may require more detail due to the size and scope of EIS-level projects.

Guidebook Revision History

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