SMART SCALE

Funding the Right Transportation Projects in Virginia

SMART SCALE Technical Guide

prepared for

Commonwealth Transportation Board

date

REVISED February 2024

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1.0 Introduction

Transportation needs will almost always be greater than the funds available to address them. The signing of House Bill 2313 in 2013 created a more sustainable revenue source supporting transportation funding. While the passage of this bill enabled the Commonwealth Transportation Board (CTB) to add significant revenues to Virginia's transportation program, many transportation needs cannot be addressed with available revenues. To find a way to better balance transportation needs and prioritize investments for both urban and rural communities throughout the Commonwealth, new legislation – House Bill 2 – was signed into law in 2014. In 2016, the process was renamed "SMART SCALE, Funding the Right Transportation Projects in Virginia." SMART SCALE stands for System Management and Allocation of Resources for Transportation: Safety, Congestion, Accessibility, Land Use, Economic Development, and Environment.

The purpose of SMART SCALE is to fund the right transportation projects through a prioritization process that evaluates each project's merits using key factors, including improvements to safety, congestion reduction, accessibility, land use, economic development, and the environment. The evaluation focuses on the degree to which a project addresses a problem or need relative to the requested funding for the project.

Prior to implementing SMART SCALE, the Commonwealth utilized a politically driven and opaque transportation funding process that included uncertainty for local communities and businesses. SMART SCALE requires the CTB to develop and implement a quantifiable and transparent prioritization process for making funding decisions for capacity-enhancing projects within the Six-Year Improvement Program (SYIP).

The ultimate goal in implementing SMART SCALE is investing limited tax dollars in the right projects that meet the most critical transportation needs in Virginia. Transparency and accountability are crucial aspects of delivering a process that project sponsors will support. SMART SCALE projects will be evaluated based on a uniform set of applicable statewide measures while recognizing that factors should be valued differently based on regional priorities.

Beginning in 2017, the SMART SCALE process transitioned to a biennial schedule with applications accepted in March of even-numbered years and final project selections made in June of the following odd-numbered year. The funds allocated through the SMART SCALE process do not cover all types of projects within the SYIP. Other sources of funding include the State of Good Repair program, the Virginia Highway Safety Improvement Program, the Revenue Sharing Program, the Congestion Mitigation Air Quality Program, the Transportation Alternatives Set-Aside Program, and Regional Surface Transportation Block Grant Program funds. These are detailed later in this guidance document.

Five rounds of SMART SCALE prioritization have been successfully completed. Since implementing the SMART SCALE process in 2015, information has been collected on lessons learned to identify potential improvements to the application in-take, screening, validation, evaluation process, documentation, and training. This updated Technical Guide reflects these recent improvements.

This Technical Guide document provides detailed information on the CTB's SMART SCALE policy, including process, roles and responsibilities, project eligibility, project readiness requirements, the project application process, evaluation measure definitions, project cost and scoring, and prioritization programming considerations and rules.

1.1 SMART SCALE LEGISLATIVE REQUIREMENTS

Virginia House Bill 2, signed by Governor Terry McAuliffe on April 6, 2014, and effective as of July 1, 2014 (as defined in § 33.2-214.1), required the development of a prioritization process that the CTB was to use for project selection by July 2016. The prioritization process evaluates projects using the following factor areas: congestion mitigation, economic development, accessibility, safety, environmental quality, and land use coordination (in areas with over 200,000 population). Factor areas are weighted differently across the commonwealth based on specific characteristics and may be weighted differently within each district. Candidate projects are screened to determine if they meet an identified need in VTrans, the Commonwealth's mid- and long-range transportation plan and if they meet eligibility requirements.

Projects are scored based on an objective and fair analysis applied statewide. SMART SCALE also requires that project benefits be analyzed relative to the project cost. CTB policy requires the project benefits to be analyzed relative to the amount of SMART SCALE funds requested, so the final SMART SCALE score is based on the project cost to the state.

In 2017, the General Assembly adopted HB2241/SB1331 (as defined in § 33.2-214.2), updating several items related to SMART SCALE. These bills provide the responsibility for implementing the SMART SCALE process to the Office of Intermodal Planning and Investment (OIPI), which reports to the Secretary of Transportation in their role as the Chairman of the CTB. It also requires that the scores be released at least 150 days prior to the CTB action to include SMART SCALE projects in the SYIP or January of odd-numbered years, ensuring there are always five months for public discussion of the results of the project evaluations.

1.2 FUNDING PROGRAMS

In February 2020, the General Assembly adopted HB1414, which revised the transportation funding formula and provided funding, after specialized programs, distributed as follows: 30% for the State of Good Repair Program (SGR); 20% for the District Grant Program (DGP); 20% for the High-Priority Projects

Program (HPP); 20% for the Interstate Operations and Enhancement Program; and 10% for the Virginia Highway Safety Program. The DGP and the HPP support the SMART SCALE prioritization process.

The DGP (as defined in § 33.2-371) refers to projects and strategies solicited from local governments that address a need for a corridor of statewide significance, regional network, improvements to promote urban development areas, or safety improvements identified in VTrans, Virginia's Transportation Plan. In this program, candidate projects and strategies from localities within a highway construction district compete for funding against projects and strategies within the same construction district.

The HPP (as defined in § 33.2-370) refers to regional or statewide significance projects that address a transportation need to be identified for a corridor of statewide significance or a regional network in VTrans, Virginia's Transportation Plan. In this program, projects and strategies compete for funding against projects and strategies submitted statewide.

For more information on funding program eligibility, see **Funding Program Eligibility.**

1.3 ROLES AND RESPONSIBILITIES

Commonwealth Transportation Board

The CTB establishes the policy and oversees the SMART SCALE project evaluation process. The CTB reviews the scored project list once the evaluation has been released, uses the scoring and other information submitted to the CTB about each project to inform their funding decisions regarding the allocation of funds for the HPP and the DGP in the SYIP. The CTB is not required to fund the highest-scoring projects and may use other considerations, in addition to the SMART SCALE process, to make final funding decisions. However, if the CTB makes modifications to the staff recommended funding scenario, the member seeking such change must provide a rationale for such modification and seek approval of the board by majority vote.

Office of the Secretary of Transportation

Under the Secretary of Transportation's Office, OIPI manages the implementation of the SMART SCALE process. Both VDOT and DRPT assist the office in the screening and evaluation of applications under the guidance of the Office. The Office provides the final evaluation to the CTB, makes the final evaluation public, and develops the staff-recommended funding scenario for the Board's consideration.

Technical Evaluation Team

A technical evaluation team is responsible for conducting the measure calculations and making qualitative rating assessments for each factor area for each of the submitted, screened projects in the SMART SCALE process. This evaluation team is comprised of technical staff from OIPI, DRPT, and VDOT. The staff appointed to the technical evaluation team includes subject matter experts from both the District and Central Office that are experienced with the data, analytical tools, and qualitative content reported for each measure. Duties of the internal technical evaluation team include:

- Validating project information;
- Evaluating project preparation; and
- Calculating evaluation measures and scores for submitted projects according to the methodologies set out in Appendices A-F.

Ten percent of projects are selected at random for a second evaluation to ensure consistency and quality control. A member of the technical evaluation team not involved in the initial analysis conducts the blind independent evaluation to ensure consistency in the development of assumptions and application of analytical methods.

Applicant Responsibilities

Applicants are responsible for ensuring that all SMART SCALE application requirements are understood. Projects submitted for SMART SCALE funding will be held to a basic standard of development to guarantee they can be evaluated reliably throughout the application process. The SMART SCALE application process is comprised of two parts: (1) A pre-application containing sufficient information for project screening and eligibility review; and (2) the remaining sections needed to complete the validation and evaluation steps. More information on the schedule for application intake can be found in **Section 1.5**.

To ensure the submittal of complete applications, it is strongly recommended that applicants complete the following tasks:

- Reach out to VDOT, DRPT, and OIPI staff early in the process
- Consider using pre-SYIP project development resources, such as Pathways-4-Planning (P4P) and the SMART Portal Pre-Scoping Module, to help develop more complete applications
- Complete a Pre-Application in March (no new applications may be created after April 1)
- Ensure project meets a VTrans Mid-term (0-10 years) Need
- Ensure project and applicant eligibility requirements have been met
- Ensure project readiness requirements have been met

- Ensure the project is appropriately defined in terms of scope, schedule, and cost estimate
- Submit a completed application by August 1, preferably earlier

For information on the required inputs to the SMART SCALE application, refer to **Section 2.3**.

1.4 STAKEHOLDER INPUT

To develop a fair and informed SMART SCALE project prioritization process that would work across all modes and throughout the Commonwealth, extensive stakeholder input was considered in its initial development. Numerous meetings were held to obtain the input of jurisdictions, agency stakeholders, and the public body across the Commonwealth.

Stakeholder engagement continues to be essential for each biennial implementation of the SMART SCALE submission process and evaluation. Collaboration and involvement continue throughout the entire process. At a minimum, the opportunities for stakeholder input include the following:

- Pre-Application and Application phase: Stakeholders have the opportunity to provide input as to what projects the jurisdictions/MPOs/PDCs/transit agencies should consider moving forward in the process through the development of an application for SMART SCALE funds as well as by providing feedback to the CTB during the annual Spring or Fall Transportation Meetings. Stakeholders may work with the state to ensure that projects are defined in sufficient detail for SMART SCALE evaluation. All of the applications and supporting analysis will be posted on the SMART SCALE website (smartscale.org) and made available for public review after scoring.
- Analysis and Scoring phase: After each SMART SCALE cycle, the evaluation of projects selected for SMART SCALE prioritization evaluation will be complete, and results will be made public. Stakeholders will have the opportunity to see each project's score.
- Results and Programming phase: Every year, during the development of the SYIP, stakeholder input is received during public meetings held following the release of the draft SYIP in April. Stakeholders will have the opportunity to provide feedback on the projects that were selected for funding for both grant programs.
- Lessons Learned and Process Improvement Evaluation: Each cycle, applicants are invited to provide feedback on opportunities for improvement to the process. Additionally, as enhancements are considered for process improvements, stakeholder input is requested prior to adoption by the CTB.

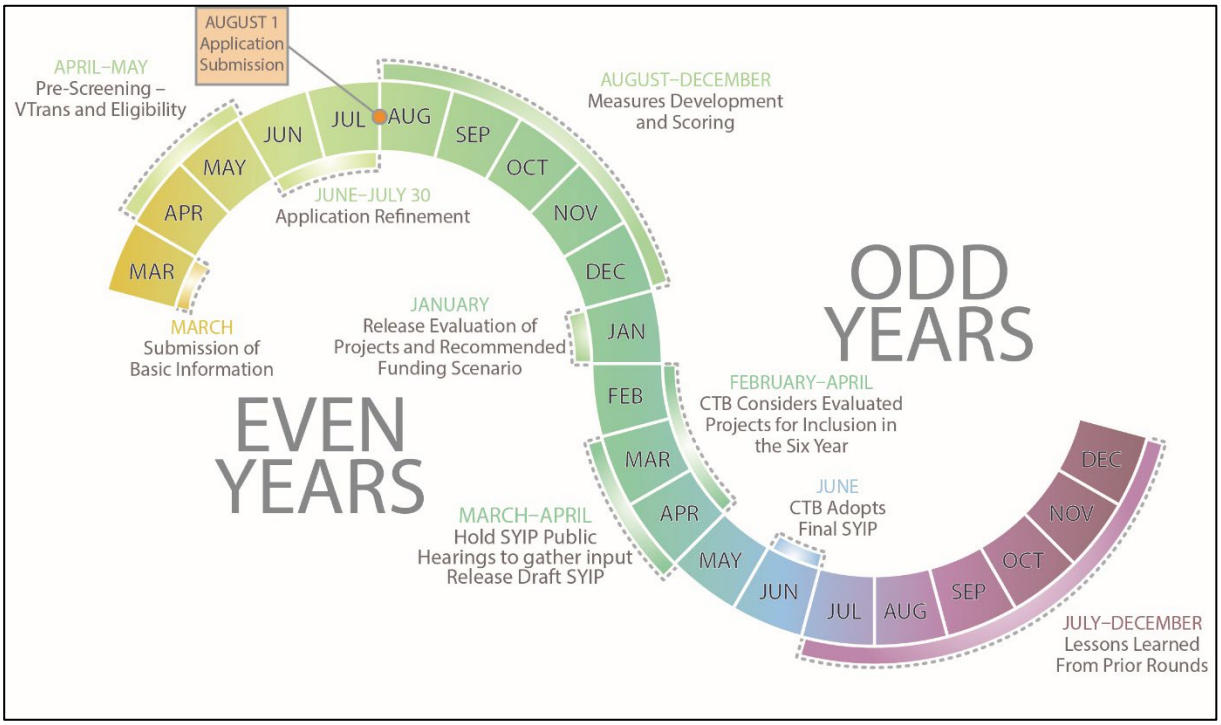
1.5 BIENNIAL SMART SCALE CYCLE

Each year that funding is available, SMART SCALE is planned to operate according to the biennial cycle illustrated in **Figure 1.1**. Applicants now have more than five months to complete their SMART SCALE applications, a significant increase from two months available in previous rounds. Eligible entities can begin creating candidate project applications starting March 1st in even numbered years from eligible entities, with complete project applications due August 1st of the same year.

All pre-applications must be created by April 1st, with a required minimum level of information to be provided by that date. No new applications can be created after the pre-application period is complete. The project location and major scope items should not be changed after pre-application submission. Applicants will be able to continue editing applications in the system from June 1st until the August 1st submission deadline. From there, OIPI, VDOT and DRPT screen, validate and evaluate the projects per the SMART SCALE process over a five-month period from August through December.

At the January CTB meeting, the results of the evaluation are released along with the staff-recommended scenario. In the spring, the draft SYIP is released by the CTB, followed by public hearings to gather input. In May, the CTB takes action on a final consensus scenario of selection SMART SCALE projects. And finally, in June (odd years), the revised final SYIP is released and considered for adoption by the CTB.

Figure 1.1 Anticipated SMART SCALE Biennial Cycle



As currently identified, the application and evaluation process timeline will generally proceed as follows (if day does not fall on business day, the first business day after will be used):

- **Winter/Spring: –** Early coordination with DRPT and VDOT prior to application submissions. Recommend engagement of P4P and Pre-Scoping Module resources.
- **March 1st through March 31st -** Applicants create pre-application containing sufficient basic project information for project screening and eligibility review.
- **April 1st –** Deadline to complete pre-application. No new applications will be allowed after April 1st.
- **April 1st through May 31st -** Pre-screening to see if projects meet VTrans Mid-term Needs and are eligible for SMART SCALE funding.
- **June 1 through July 30th** - Application refinement.
- **July 15th** – Supporting documentation due for all applications. For more information see **Section 2.3.**
- **August 1st –** Final applications due.
- **August through December –** Submitted projects are screened, evaluated, and scored.

- **January CTB Meeting –** Results of SMART SCALE screening and evaluations are made public along with the staff recommended funding scenario.
- **January through June –** SMART SCALE-funded projects will follow existing public comment period and SYIP approval process. The CTB may modify the staff recommended funding scenario through formal action.

2.0 Project Eligibility and Application Process

This section summarizes project eligibility, readiness, needs screening, and application process considerations for SMART SCALE implementation. Prospective projects must meet or exceed certain qualifications to be considered for evaluation in the SMART SCALE process, and sponsors must provide specific information for eligible projects. **Figure 2.1** illustrates the overall screening process for determining whether a project has been developed enough to assess its benefits according to the SMART SCALE evaluation and scoring process.

2.1 ELIGIBILITY REQUIREMENTS

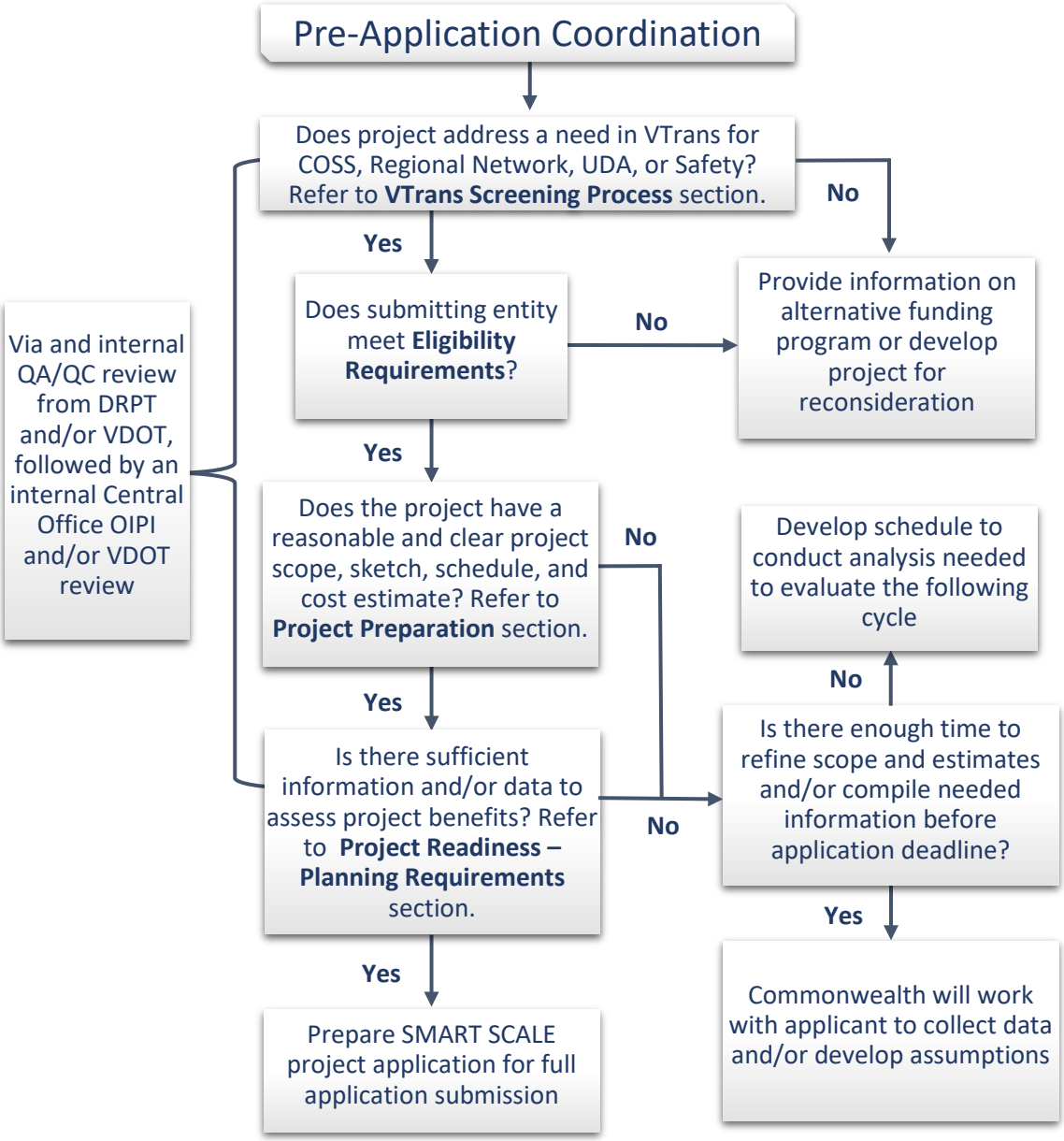
The types of projects and entities eligible for consideration are described in this section, along with a listing of funding sources not affected by SMART SCALE, and characterizations of entities eligible to submit projects. SMART SCALE projects may be submitted by a range of entities including:

- Metropolitan Planning Organizations (MPOs) and Planning District Commissions (PDCs);
- Counties;
- Cities;
- Towns that maintain their own infrastructure and qualify to receive payments pursuant to § 33.2-319; and
- Transit agencies that receive state operating assistance from the Mass Transit Trust Fund, as established in § 58.1-638(A)(4)(b)(2) of the Code of Virginia, are also eligible to submit projects.

The responsibility for transportation in those towns that do not receive maintenance payments is with the County. Counties are encouraged to coordinate with towns and prioritize candidate projects for submission similar to the Secondary Six-Year Plan process. Counties, cities, and towns that maintain their own infrastructure are eligible to submit applications regardless of the roadway system. Maintenance of the specific roadway system is not a requirement of eligibility.

An eligible entity can submit an application as long as a portion of the project is located within the boundary of the qualifying entity. An applicant cannot submit an application for a project entirely outside of the boundary of their jurisdictional authority.

Figure 2.1 Eligibility, Readiness, and Needs Screening Process



Eligible Types of Projects

There are several types of projects that are considered for SMART SCALE funding. Highway, transit, rail, road, safety improvements, operational improvements, and transportation demand management projects will be considered. The following project types are (1) not eligible or (2) will not be considered eligible to be evaluated and rated for SMART SCALE:

- Stand-alone studies;
- Projects where a majority of the SMART SCALE funding request is related to "in-kind" repair or replacement of existing traffic control devices, asset management (bridge rehabilitation, "bridge-only" bridge replacement projects, pavement repair/replacement, guardrail repair/replacement) or other activities eligible for State of Good Repair funding;
- Projects that are fully funded through other committed funding sources such as local funding or proffers. In general, projects that are fully funded in a capital improvement program, a metropolitan planning organization's transportation improvement program, VDOT/DRPT or NVTA SYIP, or committed by a developer through local zoning approval process will be excluded from consideration in evaluating and rating for SMART SCALE. However, the Board recognizes that there are unique circumstances for large projects that require flexibility. Accordingly, a fully funded project may be considered under SMART SCALE if the total project cost is reasonably expected to exceed $1 billion and will start procurement prior to the award of the next round of SMART SCALE but was ineligible for the most recent previous round of SMART SCALE due to project readiness;
    - There are several funding programs that have a project selection process outside of SMART SCALE, including federal, state, and regional authority programs. Funds from these programs may be allocated to projects and used as leverage to reduce the SMART SCALE fund request.
- Projects where a project component or feature is not contiguous, proximate, or of the same improvement type (e.g., signal improvements, transit stations, etc.). For the purposes of this policy, contiguous means adjacent or together in a sequence. Transit stops or stations along a transit route or intersections or spot improvements along a corridor meet the definition of contiguous for the purposes of the project eligibility policy;
- Projects that will replace bicycle and pedestrian facilities such as sidewalks, shared-use paths, or bike lanes must have their design upgraded from substandard to standard unless non-SMART SCALE funds are leveraged for the bicycle and pedestrian components. Non-standard materials are not eligible for SMART SCALE funds, and use of such materials shall adhere to the IIM-LD-218.4; and
- Projects that duplicate exact project components in the same location as another submitted application. The exception to this is an application

submitted with a scope falling completely within the scope of another application, where all features are exact duplicates but some are removed for phasing purposes. The reduced-scope application cannot have any features not reflected in the full-scope application.

Transit and Rail Project Eligibility

Eligible SMART SCALE transit and rail projects are capital projects that demonstrate expanded capacity and increase ridership. Maintenance projects, such as asset rehab or replacement, are not eligible under this program.

Eligible transit and rail projects under SMART SCALE are limited to the following:

- Rolling stock and necessary infrastructure for new, enhanced, or expanded fixed guideway transit such as Bus Rapid Transit (BRT), Light Rail Transit (LRT), and Heavy Rail systems, as well as other new or expanded High-capacity transit services.
- Transit stations, intercity passenger rail stations, transfer facilities, and other passenger facilities that increase ridership or system capacity.
- New or expanded platforms, platform access, and circulation infrastructure at rail stations to accommodate longer trains or increased train service.
- Multimodal facilities, such as those that accommodate some combination of services (i.e. intercity bus and Amtrak).
- Park and ride facilities with transit service.
- Technology improvements that provide enhanced transit service in high-priority corridors, such as ITS and signal prioritization.
- Enhanced modal connections, such as trails, sidewalks, and bike lanes leading to major transit stations, provided they have a transit connection and enhance transit ridership.

BRT refers to bus systems or routes that include, at a minimum, dedicated lanes and enhanced stops or stations. High-capacity transit service projects refer to new or expanded trunk routes that provide high-frequency service with headways of 20 minutes or less during peak service hours and serve as the foundation of a fixed-route bus transit system.

The assets or vehicles purchased to provide service must be used along routes included in the application for a minimum of three years from launch.

Maintenance and administrative facilities must be part of a larger service expansion project to be eligible. Agencies that utilize this provision must clearly describe the new transit or rail service that the facility will support.
The following projects do not provide expanded capacity or increase ridership and therefore are ineligible under this program:

- Maintenance equipment and supplies
- Support vehicles
- Administrative technologies

Applicants are encouraged to reach out to DRPT staff if they have questions about transit or rail project eligibility.

Other Considerations

- If an applicant submits an existing fully funded or committed project with independent utility for SMART SCALE funding with intention of requesting additional funds to add an additional project component such as landscaping, streetscaping, and/or bicycle and pedestrian infrastructure, then the benefits associated with the fully funded or committed project element(s) will be excluded from consideration in evaluating and rating the project for SMART SCALE.
- For a project phase or element with independent utility that is expected to be funded or accomplished through proffers, the costs and benefits associated with that project element will be excluded from consideration in evaluating and rating the project for SMART SCALE. Non-project-specific cash proffers are not subject to this policy and may be used as other committed funding in the SMART SCALE project application. If the applicant desires to submit a project with proffered conditions and seeks to obtain SMART SCALE funding for, or in lieu of the proffer, the proffer must have been legally rescinded or terminated before the applicant may submit an application for the project.
- All projects submitted for funding must be developed in accordance with all applicable policies and procedures (CTB, VDOT, DRPT, FHWA, FTA). For example, the CTB's policy regarding bicycle and pedestrian accommodations applies to all candidate projects.
- Systemwide upgrades will not be considered for SMART SCALE scoring.
- All projects selected for funding that can qualify for Federal funds shall be developed as federally eligible projects.
- Signal controller/software upgrades should be considered eligible for SMART SCALE funds if they meet the following standards:
    - The proposed project is not an "in-kind" repair or replacement of existing traffic control devices, with the exception of implementing adaptive signal control.
    - To justify the project, documentation shall be provided that includes analysis with supporting models and/or simulation outputs from a VDOT accepted software (HCS, Synchro, VISSIM, etc.). The documentation should also demonstrate operational or safety benefits from the proposed improvements.
    - All request for new traffic signals or upgrades to an existing traffic signal system shall conform to the latest VDOT Standards and Specifications (VDOT approved controller, cabinet, communication system and detection system).

- D4 software shall be used with VDOT approved controllers where the signal is maintained by VDOT. (Per TOD policy).

Table 2.1 shows the general project types that are eligible to receive SMART SCALE funds.

Table 2.1 Process Types Eligible for SMART SCALE Funding

Project Types Included within SMART SCALE (Capacity, Safety and Operational Improvements only)	Project Types Excluded from SMART SCALE
• Highway Improvements (Widening, Operational Improvements, Access Management, Intelligent Transportation Systems, Technology, and Safety Improvements)	• Studies, Asset Management (bridge rehabilitation, "bridge-only" bridge replacement projects, pavement repair/replacement, guardrail repair/replacement)*
• Transit and Rail Capacity Expansion	• Planning studies
• Bicycle and Pedestrian Improvements	• Systemwide improvements
• Transportation Demand Management (Vanpool, carpool, trip reduction programs, and park and rides - including new, expanded, or designated spaces on publicly-owned property).	• Transit maintenance facilities without capacity expansion

*Asset Management projects excluded from SMART SCALE may be eligible for funding under the State of Good Repair program as pursuant to 33.2-369 of the Code of Virginia.

In addition, projects must meet a need identified in VTrans as defined in SMART SCALE legislation:

> "Candidate projects and strategies shall be screened by the Commonwealth Transportation Board to determine whether they are consistent with the assessment of capacity needs for all corridors of statewide significance, regional networks, and improvements to promote urban development areas established pursuant to § 15.2-2223.1, undertaken in the Statewide Transportation Plan in accordance with § 33.2-353."

The process for screening projects based on VTrans needs is described in more detail in **Section 2.2**.

Entities Eligible to Submit Projects

Public transit agencies and regional entities, including Metropolitan Planning Organizations (MPO), the Northern Virginia Transportation Authority, and Planning District Commissions (PDCs) are eligible to submit projects, along with counties, cities, and those towns that maintain their own infrastructure. To support local and regional planning efforts and consistency with the Constrained Long Range Plans (CLRP), a resolution of support from the MPO is needed for all projects within the MPO study area that are not included in or consistent with the

adopted CLRP. If a project is included in or consistent with the CLRP, then a resolution is not required. A summary of the entities eligible to submit projects for SMART SCALE is presented below in **Table 2.2**.

Table 2.2 Eligibility to Submit Projects

Project Facility Type	Regional Entity (MPOs, PDCs)	Locality (Counties, Cities, and Towns)	Public Transit Agencies
Corridor of Statewide Significance	Yes	Yes, with a resolution of support from relevant regional entity	Yes, with resolution of support from relevant regional entity*
Regional Network	Yes	Yes, with a resolution of support from relevant MPO*	Yes, with resolution of support from relevant regional entity*
Urban Development Area	No	Yes, with a resolution of support from relevant MPO*	No
Safety	No	Yes, with a resolution of support from relevant MPO*	No

* Projects within established MPO study areas that are not identified in or consistent with the regionally adopted Constrained Long-Range Plan (CLRP) must include a resolution of support from the respective MPO Policy Board.

Applicants are expected to prioritize the applications they submit. The limit on the number of pre-applications and applications allowed per applicant is based on population thresholds as shown in the table below:

- Localities with a population *below* 200,000 and MPOs/PDCs/Transit agencies that serve a population *below* 500,000 may submit a maximum of four applications and five pre-applications;
- Localities with a population *above* 200,000, and MPOs/PDCs/Transit agencies that serve a population *above* 500,000, may submit a maximum of ten applications and twelve pre-applications; or
- A Board member may allow one additional application from a county within their district if (1) the project is located within a town that is ineligible to submit projects and (2) the county in which the town is located will submit the maximum number of applications allowed. Only one such additional application is allowed per district.

Table 2.3 Application Limits by Population

Localities	MPOs/PDCs/Transit Agencies	Pre-Application Cap	Full Application Cap
Less than 200,000	Less than 500,000	5	4
Greater than or equal to 200,000	Greater than or equal to 500,000	12	10

The source of population data for cities, counties, and PDCs is the latest University of Virginia Weldon Cooper Center, Demographics Research Group estimates. The

data for MPOs and towns is not available from the Weldon Cooper Center and is from the latest decennial United States Census. Application limits for transit agencies is determined based on the latest service area population in the National Transit Database (NTD) Transit Agency Profiles. If service area population is not available in NTD, the latest Census data was used to determine population in jurisdictions served by the transit agency.

The listing of eligible entities, population data and tier/maximum number of applications is available in a spreadsheet that can be downloaded in the Apply section of the webpage.

Note that if an applicant submits more than one project for consideration, as part of the application process, applicants may be asked to rank their submitted projects based on priority. Applicants are encouraged to focus on their highest priority needs as each applicant is limited in the number of applications it can submit.

By majority vote, the CTB may choose to submit up to two projects for evaluation each application cycle.

Funding Program Eligibility

Applications for funding through either the HPP or the DGP must relate to projects within the qualifying entity's boundary. Localities and regional planning bodies may submit joint applications for projects that cross boundaries.

For both programs, projects and strategies must be screened, evaluated, and selected according to the process established pursuant to SMART SCALE.

Table 2.4 Funding Program Eligibility

Project Type	High Priority Projects Program	District Grant Program*
Addresses Need on Corridor(s) of Statewide Significance	Yes	Yes
Addresses Need on Regional Network(s)	Yes	Yes
Improvement to Support Urban Development Area(s)	No	Yes
Addresses Identified Safety Need	No	Yes

*Only projects submitted by localities are eligible.

In order for submitted applications to be eligible for HPP funds, at least one of the features identified in **Table 2.5** must be selected in the SMART Portal application.

Table 2.5 Features Required for HPP Eligibility

Feature Category	Feature Name
Highway	Add New Through Lane(s); Roadway on New Alignment; Managed Lane(s) (HOV/HOT/Shoulder); Improve Grade Separated Interchange; Innovative Interchange; New Interchange, Non-Limited Access Facility; New Interchange, Limited Access Facility; New Bridge
Transit	New High-Capacity or Fixed-Guideway Route/Service; Increase Existing High-Capacity or Fixed-Guideway Route/Service; Construct or Expand Bus Facility
Rail	Rail Service Improvements; New Station or Station Improvements; Intercity Passenger Rail Service Improvements; New Intercity Passenger Rail Station or Station Improvements; Freight Rail Improvements

Alternatively, an application is eligible for HPP funds if the proposed improvements are identified as the preferred alternative of one of the following studies:

- STARS
- Pipeline
- Arterial Management Plan
- VDOT/MPO/Transit/Local study with components equivalent to one of the previously listed studies, completed in coordination with VDOT staff, and meeting the definition of "regionally significant" in accordance with 23 CFR 450.104.

2.2 VTRANS SCREENING PROCESS

VTrans Needs Screening

Screening for transportation needs identified in Virginia's Transportation Plan (§ 33.2-353), VTrans, is a critical component of SMART SCALE as it links the planning process to the programming process to ensure that the overarching transportation goals of the Board are advanced. Transportation needs identified in VTrans are referred to as VTrans Mid-term Needs.

All project funding applications submitted for the SMART SCALE process must be consistent with one or more Mid-term Needs identified in VTrans, which identifies critical safety and capacity related needs for the following four travel markets:

- **Corridor of Statewide Significance (CoSS)** – 12 corridors that include highways, railroads, and seaport and airport facilities that move people and goods within and through Virginia, serving primarily interregional and long-distance travel;

- **Regional Networks (RN) –** 15 Regional Networks that are based on designated Metropolitan Planning Organizations (MPO) within the Commonwealth, serving primarily intraregional travel;
- **Urban Development Areas (UDA) –** this travel market includes: (1) multimodal infrastructure within over 200 designated growth areas based on local initiatives pursuant to § 15.2-2223.1; and (2) locally-identified Industrial and Economic Development Areas (IEDA) included in Virginia Economic Development Partnership's (VEDP) Virginia Business Ready Sites Program (VBRSP) (§ 2.2- 2238 C) tier 3 or higher; and,
- **Statewide Safety –** entire roadway network in the Commonwealth. Projects that are proposed to address a safety issue not identified as a VTrans safety need shall include a safety analysis/study that includes a purpose and need statement, AADT traffic data, field review observations, geometric design review, alternatives considered, the preferred alternative, expected benefits and a summary of conclusions. Additionally, the study area should have recorded at least 3+ Fatal or Injury crashes at the intersection or segment over the last five years.

In January 2020, the CTB adopted the Policy for the Identification of VTrans Mid-term Needs, which identifies criteria and thresholds for needs under each of the four travel markets listed above.

The Policy for the Identification of VTrans Mid-term Needs was operationalized to identify VTrans Mid-term Needs in 2021. The identified VTrans Mid-term Needs can be accessed using Interact VTrans, an interactive mapping application developed for viewing, downloading, and querying VTrans Mid-term Needs as well as other relevant datasets.

VTrans Mid-term Needs for UDAs and IEDAs are identified on a rolling basis as localities designated UDAs, or IEDA sites based on VEDP's Business-Ready Sites Program achieve Tier 3 or higher. The applicants should contact OIPI's Statewide Transportation Planning (STP) Section and note potential UDA or IEDA status changes in their application. April 1st, 2024 is the deadline for establishing a new UDAs or conveying an updated readiness tier for an IEDA to OIPI to be considered for the Smart Scale application intake in 2024.

Similarly, applicants can propose safety improvements to address a safety issue not identified as a 2021 VTrans Mid-term Need either based on: (1) 2021 VTrans Mid-Term Need; or (2) a safety analysis/study that includes a purpose and need statement, AADT traffic data, field review observations, geometric design review, alternatives considered, preferred alternative, expected benefits and a brief summary of conclusions.

In such instance, applicants should select the following option in SMART Portal, "if you have a safety study or a study conducted based on a 2021 VTrans Mid-Term need, check here and provide documentation in the attachments section. "The submitted safety analysis/study will be evaluated to ensure that it

meets the following Need identification criteria adopted by the CTB as part of the VTrans policy: At least 3+ Fatal or Injury crashes at the intersection or segment over the last five years.

Project applicants are required to include the following components in their application and demonstrate how their proposed project meets one or more VTrans Mid-term Needs:

1. Identify one of the four relevant travel markets;
2. Identify one or more VTrans Mid-term Needs; and,
3. Describe how the project purpose meets one or more identified VTrans Mid-term Needs.

Each project funding application is reviewed by sets of reviewers: (1) VDOT District or DRPT staff; and (2) OIPI STP Section to ensure that the proposed improvement(s) meet one or more relevant VTrans Mid-term Needs. If a project does not address an identified need in VTrans, it is screened out and not considered for validation or scoring.

2.3 APPLICATION AND VALIDATION PROCESS

To support the success of the evaluation process, applicants are encouraged to coordinate with VDOT and DRPT early in the process to share information on prospective applications. This coordination phase will allow detailed project descriptions, scopes of work, proposed schedule durations, cost estimates, and potential benefits to be developed and refined to facilitate the application and evaluation process.

Applicants are required to create a pre-application within the online application tool by April 1. Project applications created by April 1 will be reviewed for eligibility, project readiness and screened to determine if the project meets a VTrans Mid-term Need based on the CTB policy. This will provide the project sponsor with screening and eligibility determination. No new applications may be created after April 1. VDOT and DRPT will be available to assist in application preparation.

Pre-Application Coordination and Submission

VDOT and DRPT strongly encourage early coordination with VDOT and DRPT as they consider projects for application submission, as well as engaging available pre-SYIP project development tools like P4P and the Pre-Scoping Module. The online application tool (SMART Portal) will open on March 1st, allowing project sponsors to begin application development. All candidate project applications must be created by April 1st, and no new applications will be allowed after April 1st. The project location and major scope items should not be changed after pre-application submission. There is a cap on the number of candidate project applications that can be submitted which are defined in **Table 2.3.** To further facilitate VDOT and DRPT assistance in developing project applications, an

applicant must submit basic information by April 1st to guarantee technical assistance from the two agencies. The pre-application will identify if projects meet a VTrans Mid-term need, are eligible and ready before submission, and provide advance knowledge of the number and type of applications. Project Sponsors will be notified prior to submission if their application meets a VTrans Mid-term Need and is eligible. OIPI, VDOT and DRPT will strive to complete VTrans screening and eligibility determinations early depending on when information is provided in the SMART Portal. See the SMART Portal User Guide for detailed requirements and guidance.

The SMART Portal warnings for different project features selected are outlined in **Table 2.6** At the pre-application submission, draft versions of documents are acceptable. In order to ensure that document requirements and timelines are communicated effectively, the Portal will prompt the applicant to check a box acknowledging the requirements for each selected feature and confirming that the necessary documents will be completed before the August 1st full application submission deadline. For certain high-risk documents such as Interchange Access Reports, the prompt will include a list of VDOT staff who must be engaged in the document creation process before the April 1st pre-application submission deadline. These acknowledgements must be completed by the applicant for the pre-application to be submitted.

Project Preparation

Projects submitted as candidates for SMART SCALE funding will be held to a basic standard of development to ensure they meet basic readiness criteria and have sufficient detail to be evaluated and scored. Additionally, all project submissions must comply with relevant federal, state, and CTB policies. VDOT and DRPT intend to support project sponsors prior to application submission to help project sponsors understand and meet expectations.

SMART SCALE project applications must include the following information.

Project Description Requirements

The project description must reflect all project features associated with a project and describe the limits of the project including its physical and operational footprint. The description should focus on the scope of the project and not why the project is being pursued or the benefits of the project.

Sketch Requirements

All projects are required to have a conceptual sketch that displays and locates the project elements described in the detailed project description. The sketch should show a plan view of the project in its completed form but clearly articulate any new features that are proposed. Detailed design plans (construction documents) prepared with the land survey are not required; however, the sketch should be drawn to scale and over the latest available aerial imagery. Bicycle and pedestrian

elements, including crosswalks, must be shown in the sketch to receive scores in those categories.

Detailed construction plans that have been previously prepared can be used for the project sketch; however, the construction plans must reflect the project described in the project description. Any differences between the project description and the design plans should be reflected in a sketch.

Schedule

At a minimum, the schedule should clearly define the expected process for further project development, including key milestones, work activities, related activities, and approvals/approval timelines. The schedule should be realistic and reflect the complexity of the project. For any future planned phase start date for which funding is requested, the applicant should assume a start date no earlier than August 1st of the first available fiscal year of funding. This information will be used in validating project costs and schedules. Actual dates may be earlier or later depending on several project-specific factors such as federal and/or state phase authorization requirements (ex. required TIP/STIP actions, project administration agreements) and the availability of funding by fiscal year.

Planning Study Requirements

At a minimum, a planning assessment/study, operational analysis, and/or safety assessment should be prepared prior to applying for SMART SCALE funds. The provided assessment/analysis should reflect the candidate project.

Projects that are proposed to address a safety issue not identified as a VTrans safety need (**Refer to Section 2.3**) shall include a safety analysis/study that includes a purpose and need statement, AADT traffic data, field review observations, geometric design review, alternatives considered, the preferred alternative, expected benefits and a summary of conclusions.

The level of detail of the analysis/study will vary based on the project's complexity; however, project types with greater requirements are detailed later in this section. Required supporting documents must have been completed or updated within 10 years of the August 1st submission deadline. Refer to **Table 2.6** for the full list of readiness requirements by project type.

Cost Estimates

- At a minimum, the cost estimate should be as realistic as possible. It should account for applicable allowances, risks, and contingencies based on the size, complexity, and level of design of the project. Projects should not be divided/segmented to the extent that they no longer have logical termini or independent utility. Cost estimates shall adhere to the procedures outlined in the latest version of the VDOT Cost Estimating Manual. All cost estimates shall be prepared with the assumption that the projects will be administered by VDOT. Cost estimates shall be provided in the base year specified in the

SMART Portal. The base cost estimate for each phase should account for all expected defined costs and allowances. A Risk/contingency percentage (%) or amount should also be entered in the SMART Portal. Inflation will be applied to each phase estimate uniformly within the SMART Portal based on the proposed start date for each phase of work. Furthermore, projects must meet the relevant federal requirements for consistency with adopted Constrained Long Range Plan (CLRP) in order to make use of funding received through SMART SCALE and to advance in project development.

Design Waivers (DW) and Design Exceptions (DE) can be acceptable assumptions to include as part of SMART SCALE project submission, assuming there is proper documentation and support from the responsible approver as required by IIM-LD-227. This policy is to address concerns regarding DWs and DEs which are not formally approved at the time of intake for SMART SCALE, and formal approval would only occur in future PE phase as part of project design if funded. Additional guidance on DWs and DEs can be found on the SMART SCALE Apply page, and applicants may choose to include a completed SS04 Design Waiver / Design Exception Summary Form which can also be found on the SMART SCALE Apply page.

Projects with an estimated total cost greater than $100 million are required by both state and federal code to have a financial plan. If selected for funding, the initial project financial plan will be required prior to federal authorization of construction phase funding. The financial plan document provides reasonable assurance that there will be sufficient funding available to implement and complete the entire project as planned. Additional information on financial plan requirements can be found on the Financial Plans section of the VDOT Website.

The estimated cost of the project is a critical input used to determine each project's SMART SCALE score and ranking. Prior to submitting project applications, applicants should work in conjunction with VDOT and DRPT staff to develop reliable cost estimates as part of the application process. Increases in project cost and SMART SCALE funding requests, could result in reevaluation of the project and potentially a loss of funding as described in **Section 5.3**.

Phase estimates should account for the total cost of the phase to include costs of any previous work or accomplishments (i.e., life to date or expected expenditures as of the time of application submission) to date on existing phases. To the extent possible, right-of-way phase costs should attempt to exclude the value of donated land or easements or other rights-of-way phase-related in-kind contributions. If such aspects are included as a part of the phase's cost estimate, the applicant should denote that the value of such items is reflected as "Local Funds" in the Project Funding Sources described below.

All cost estimates will be reviewed and validated by VDOT and DRPT staff. If there are disagreements pertaining to proposed cost estimates between an applicant and VDOT, the relevant VDOT District Engineer will provide final

approval on any proposed project costs. For rail and transit projects, the DRPT Director (or their designee) shall provide approval on any proposed project costs.

Leveraged Funding

Committed funds cover the difference in total project cost and SMART SCALE request so that the project is fully funded through construction or equivalent delivery phase. By Code, all SMART SCALE projects are required to demonstrate full funding within the six-year horizon of the Six-Year Improvement Program (SYIP); therefore, all funding required to deliver the project's cost must be identified in the SYIP at the time of project selection and approval. Applicants are encouraged to identify other sources of funding (local, regional, proffers, other stated/federal funds) to reduce the amount of funding being requested via SMART SCALE.

For any leveraged funding listed on the application that has not yet been identified in the Six-Year Improvement Program (SYIP) or officially applied for via processes outside of the SMART SCALE process at the time of application submission, such funding should be noted as "local" funding. Applicants must submit a letter of commitment that they are responsible for such committed funds even if the original source of the funds becomes or is no longer available.

- Ex: Listing anticipated or future applications for funding outside of the SMART SCALE process will result in a commitment of local funds being required until such time funds become available.
- FTA CIG program funding may also be considered as leveraged funds. See **Transit Project Readiness** for more information.

SMART SCALE funding is not intended to replace other committed funding sources such as local/regional funding, proffers, and/or other committed state or federal funding sources. In general, projects that are fully funded in a capital improvement program, a metropolitan planning organization's transportation improvement program, VDOT/DRPT or NVTA SYIP, or required to be paid by a developer as a result of a local zoning process will be excluded from consideration in evaluating and rating for SMART SCALE. To ensure that a proffer is accepted as other committed funds, it needs to be void of language that references a specific project (or project element with independent utility) and instead should only apply to a general area or corridor.

The CTB may waive this requirement for projects that:

- have an anticipated total cost in excess of $1 billion; and
- were not eligible for submission in the previous round of SMART SCALE due to readiness considerations but initiated procurement prior to award of the current round of SMART SCALE.

If a fully funded project is submitted with additional features that are not yet funded, the benefits associated with the fully funded or committed project

element(s) will be excluded from consideration in evaluating and rating the project benefits for SMART SCALE.

Other committed funds must have at least been applied for at the time of the SMART SCALE application submission.

- Future applications for funding provided by the CTB will not be considered leveraged or committed funds. This includes but is not limited to Revenue Sharing, State of Good Repair, Transportation Alternatives, Virginia Highway Safety Improvement Program, Interstate Operations and Enhancement, Innovation and Transportation Technology Fund, or other application-based or discretionary funding controlled by the CTB.
- Future applications for funding not provided by the CTB, such as MPO controlled, regional funding, or other grant funding sources outside of CTB selection purview, must be supported by a local funding commitment at the time of application as this forms the basis for programming full funding for a project in the SYIP at the time of selection and approval.

Screening and Validation (Pre- and Post-Application Submittal)

All submitted pre-applications will be screened based on the following three items: 1) project eligibility, 2) project readiness, and 3) project meeting a VTrans Mid-term Need adopted by the CTB. Depending on the completeness of available data, the VDOT and DRPT staff may request additional information or identify issues that need to be resolved. Final submitted applications are reviewed by internal technical staff and must be fully validated to move forward into the evaluation and evaluating process. Validation helps to ensure the information in the application is accurate, reasonable, and consistent with CTB policies.

If there is disagreement concerning the cost estimate or other application data that impacts the evaluation that cannot be resolved between the applicant and VDOT/DRPT SMART SCALE Point of Contact, the applicant may request resolution from the VDOT District Engineer/Administrator or the DRPT Director.

Based on the review and validation by internal technical staff, a project application may be recommended to not advance to evaluation since the project type of applicant is not eligible for SMART SCALE or the project has been determined to not meet project readiness requirements or lacks sufficient detail to calculate project benefits.

Certain projects that are based on conceptual planning-level recommendations and have not been formally scoped or defined may require additional planning/pre-scoping level work before their benefits can be adequately assessed according to the SMART SCALE factors and measures. Planning and pre-scoping resources exist within VDOT, DRPT, localities, regional planning bodies, and some other entities (e.g., SPR, PL, Pre-scoping, FTA 5303, FTA 5304, etc.). However, resources are unlikely to be sufficient to fund every potential request for assistance for project development related to the SMART SCALE process. Additional information on project eligibility and project readiness is included in **Section 2.4**.

Readiness Gate Validation Process

To improve communication and ensure that document requirements are met in a timely fashion, applications must clear up to three checkpoints, or readiness gates, based on the selected features and project location. These gates are completed in the SMART Portal and are designed to formalize the staff review process. Additional information including a list of readiness gate requirements for each feature can be found in **Appendix H**: **Readiness Gates.**

Gate 1 (Applicant Responsibility): Pre-Application Submission

While creating the initial pre-application, applicants will be provided with the supporting document requirements for each selected feature as well as a list of VDOT staff required to be engaged in the development of certain documents before the April 1st pre-application submission deadline. Applicants must check a box to acknowledge the requirements for the pre-application to be submitted.

Gate 2 (VDOT Responsibility): Pre-Application to Full Application Conversion

For certain high-risk documents such as Interchange Access Reports, VDOT staff will check a box during pre-application screening confirming that they were engaged by the applicant in the creation of the document and that the document will support the associated application. All high-risk documents must have staff concurrence before the pre-application can be converted to a full application.

Gate 3 (VDOT/DRPT Responsibility): Full Application Submission

For all supporting documents, VDOT or DRPT staff will verify during the full application process that they have reviewed the document and agree that it fulfills the requirements of the associated feature, subject to executive review. All supporting documents must be submitted by July 15th and have staff confirmation before the full application can be submitted by the August 1st deadline.

Application Withdrawal

If an applicant wishes to withdraw an application for any reason, the applicant should notify District staff of the decision to withdraw, then submit a comment in the SMART Portal within the application they wish to withdraw. The comment should be labeled "All Sections" and should state the intention to withdraw the application and provide a reason for the withdrawal.

If an applicant wishes to revoke a withdrawal, they must discuss the decision with District staff to ensure that the application can be completed and screened in a timely manner. VDOT and OIPI staff must provide approval before withdrawal can be revoked. If approval is provided, OIPI staff will revert the application's status and the applicant should submit a new comment in the SMART Portal. The comment should be labeled "All Sections" and should state the revocation and provide the date of staff approval.

2.4 PROJECT READINESS – PLANNING REQUIREMENTS

In order to reduce risk to changes in project scope or budget and to ensure that a project can advance to construction, projects must demonstrate a certain level of readiness. This section guides the required level of planning and supporting documentation needed for projects to be considered and evaluated for SMART SCALE funding. All projects must include a detailed description for each project feature that focuses on the scope of the project and not the benefits of the project.

The following guidelines will be used to assist the applicant in providing a complete and accurate application regarding specific project types. Applicants are encouraged to coordinate with VDOT and DRPT staff for assistance in determining and/or supporting the development of project readiness analysis and documentation. If the required level of planning and supporting documentation has not been completed, the project application will be excluded from consideration in evaluating and rating in SMART SCALE. Supporting documentation will be required for application submission. If such documentation needs to be updated during the project development process, this would be considered an eligible project expense and should be included in the project's cost estimate.

While each document requirement must be fulfilled, it is not always necessary to provide a separate document for each feature. For example, a STARS or Pipeline study can fulfill the operational and alternatives analysis requirements for a variety of features along a corridor. Similarly, an Interchange Access Report can fulfill the Signal Justification Report requirement for any signals planned as part of the interchange improvement project. Applicants should coordinate with VDOT and DRPT staff to determine whether a study can be used to fulfill multiple document requirements simultaneously.

Table 2.6 Application Warnings for Project Features Selected

Project Feature Selected	Warning Message
Bike/Pedestrian Other, Construct Shared-Use Path, Construct Sidewalk, Construct or Improve Grade Separated Bike/Pedestrian Crossing, Access Management, Improve Rail Crossing, Improve or Replace Existing Bridge(s), New Bridge, New Intersection, Roadway Reconstruction/Realignment, Shoulder Improvement(s), Traffic Signal Modification, Widen Existing Lane(s) (No New Lanes), Includes In-Plan Utility Betterment, Includes Utility Relocations, Right-of-Way/Easements acquisition required	None
Construct or Improve Bicycle Facility	The details of this feature must satisfy the facility selection criteria provided on pages 14-15 of the Road Design Manual Appendix A(1).
Construct or Improve Bus Stop / Shelter, Increase Existing High-Capacity or Fixed-Guideway Route/Service, Other Transit Technology Improvements, Rail Transit Other	Fill out the Transit Pearl for your project.
Construct or Convert Existing General Purpose or Parking Lane to Bus-only Lane, Roadway Reconfiguration	Provide a traffic operational analysis (i.e. HCS, Synchro), which documents a preferred alternative that is consistent with the scope described in the application to support this feature.

Project Feature Selected	Warning Message
Construct/Expand Bus Facility, New High-Capacity or Fixed-Guideway Route/Service	Provide a TDP/TSP, Comp Plan, LRTP, or equivalent study which documents recommendations consistent with the project scope. Provide a feasibility study, route and stop level ridership projections, and a letter of support. For any new fixed guideway projects, provide evidence that a locally preferred alternative (LPA) has been identified. For passenger facility projects that seek funding for land purchases, provide a feasibility or site selection study. Provide a completed SMART SCALE Transit Environmental Review Form, available on the Resources page of the SMART SCALE website. Fill out the transit pearl for your project.
Add New Through Lane(s), Managed Lane(s) (HOV/HOT/Shoulder)	Provide a Planning Study/Safety Study, which includes an operational analysis and documents a preferred alternative that is consistent with the scope described in the application to support this feature. If a major widening (two or more lanes), the planning study must include an alternatives analysis that considers improvements without widening.
Freight Rail Improvements	Provide conceptual (10%) design plans consistent with the project scope. Provide carload projections and a letter of support from the stakeholder railroad owner or operator. Fill out the Transit Pearl for your project.
Highway Other	This feature should only be selected when the project feature doesn't fit into another feature. Examples may include improving pavement markings and/or signage, concrete barriers, overhead signage, or lighting.
Construct or Improve At-Grade Bike/Pedestrian Crossing	If improving an uncontrolled approach or mid-block crossing and an engineering study is required for the location by IIM-384.1, provide a completed SMART SCALE Uncontrolled Crossing Study form, available on the SMART SCALE website.
Improve Grade-Separated Interchange; Innovative Interchange (Existing)	Provide a draft or final Interchange Access Report (IAR) or Operational and Safety Analysis Report (OSAR) that includes an alternatives analysis and supports the proposed alternative. A signed framework document must be uploaded prior to pre-application submittal. The report shall address the appropriate elements described in IIM-LD-200.11 and Traffic Operations and Safety Manual (TOSAM) guidelines for the proposed access modifications. If the proposed interchange alternative was proposed in a Round 5 application that was screened in but did not receive funding, that alternative may be submitted with the previously eligible supporting study for Round 6.
Innovative Intersection(s)	Provide a traffic operational analysis (i.e., HCS, Synchro), which documents a preferred alternative that is consistent with the scope described in the application to support this feature. If on a Corridor of Statewide Significance or the Arterial Preservation Network, provide a completed iCAP assessment tool or documentation demonstrating adherence to IIM-TOD-397.
Intersection Improvement(s), New Intersection	If on a Corridor of Statewide Significance or the Arterial Preservation Network and modifying the intersection configuration, provide a completed iCAP assessment tool or documentation demonstrating adherence to IIM-TOD-397.
ITS Improvement(s) / Advanced Signal Control	If a corridor-level Advanced Signal Control project, provide a Planning Study/Safety Study which includes an operational analysis and documents a preferred alternative that is consistent with the scope described in the application.
Innovative Interchange (New); New Interchange, Limited Access Facility; New Interchange, Non-Limited Access Facility	Provide a draft or final Interchange Access Report (IAR) that includes an alternatives analysis and supports the proposed

Project Feature Selected	Warning Message
	alternative. A signed framework document must be uploaded prior to pre-application submittal. The report shall address the appropriate elements described in IIM-LD-200.11 and Traffic Operations and Safety Manual (TOSAM) guidelines for a new interchange. If the proposed interchange alternative was proposed in a Round 5 application that was screened in but did not receive funding, that alternative may be submitted with the previously eligible supporting study for Round 6.
New Station or Station Improvements, Rail Service Improvements	Provide a Planning Study/Feasibility Study documenting a locally preferred alternative consistent with the project scope. Fill out the transit pearl for your project.
New Traffic Signal	Provide an approved signal justification report for your project to support this feature.
Ramp Improvement(s)	Provide a draft or final Operational and Safety Analysis Report (OSAR) that includes an alternatives analysis and supports the proposed alternative. A signed LD-459 framework document must be uploaded prior to pre-application submittal. The report shall address the appropriate elements described in IIM-LD-200.11 and Traffic Operations and Safety Analysis Manual (TOSAM) guidelines for the minor access modifications related to ramps, ramp termini, and traffic control. SMART SCALE readiness requirements exempt acceleration and deceleration lane extensions, but an OSAR or similar study could be required by VDOT if selected for funding. If the proposed interchange alternative was proposed in a Round 5 application that was screened in but did not receive funding, that alternative may be submitted with the previously eligible supporting study for Round 6.
Roadway on New Alignment	Provide a Planning Study/Safety Study, which includes an operational analysis and documents a preferred alternative that is consistent with the scope described in the application to support this feature. The study must include an alternatives analysis that considers improvements not on a new alignment.
Construct or Improve Turn Lane(s)	If constructing a new turn lane, provide turning movement counts.
Intercity Passenger Rail Service Improvements, New Intercity Passenger Rail Station or Station Improvements	Provide a Planning Study/Feasibility Study including ridership projections, route alignment, proposed stops, and draft schedule. Provide conceptual (10%) design plans consistent with the project scope and a letter of support from the stakeholder railroad owner or operator. Fill out the Transit Pearl for your project.
Improve Park and Ride Lot, New Park and Ride Lot	Include a project sketch that depicts the lot location, boundaries, entry and exit points, parking space layout, increased number of parking spaces, transit circulation, and amenities where applicable.
New/Expanded Vanpool or On-Demand Transit Service	Fill out the Transit Pearl for your project and upload a feasibility study, including ridership projections.
TDM Other	This feature should only be selected when the project feature doesn't fit into another feature. Examples include ridesharing or teleworking features.

Grade Separation Projects

If an interchange alternative was proposed in a SMART SCALE Round 5 application that was screened in but did not receive funding, that alternative may be submitted with the previously eligible supporting study for Round 6. Beginning in Round 7, all interchange features will require a draft or final IAR or OSAR to support the proposed project.

Grade Separation on Limited and Non-Limited Access Facilities

Proposed new grade separated interchanges on existing limited and non-limited access facilities require a draft or final Interchange Access Report (IAR) that includes an alternatives analysis and supports the proposed alternative. The report shall address the elements described in IIM-LD-200.11 and Traffic Operations and Safety Manual (TOSAM) guidelines for a new interchange. A signed LD-459 framework document must be provided with the pre-application, and concurrence of the appropriate District and Assistant State Location and Design Engineer is required. FHWA coordination may be required. For all interchange projects, VDOT needs to understand the specific interchange configuration or modifications proposed for funding in order to calculate the benefits.

Improvements to Grade-Separated Interchanges

Improvements to grade-separated interchanges require a draft or final Interchange Access Report (IAR) or Operational and Safety Analysis Report (OSAR) that includes an alternatives analysis and supports the proposed alternative. The report shall address the appropriate elements described in IIM-LD-200.11 and Traffic Operations and Safety Manual (TOSAM) guidelines for the proposed access modifications. A signed LD-459 framework document must be provided with the pre-application, and concurrence of the appropriate District and Assistant State Location and Design Engineer is required. FHWA coordination may be required. SMART SCALE readiness requirements exempt acceleration and deceleration lane extensions, but an OSAR or similar study could be required by VDOT if selected for funding.

Innovative Interchanges

The Innovative Interchange feature is intended to capture several different types of project:

- Constructing *new* innovative interchanges; these are subject to the same readiness requirements as the New Interchange features and must be supported by a draft or final IAR.
- Converting *existing* interchanges to an innovative interchange configuration, or improving an *existing* innovative interchange. These are subject to the same readiness requirements as the Improve Grade-Separated Interchange and must be supported by a draft or final IAR or OSAR.

New Traffic Signals

Proposed new traffic signals must meet VDOT spacing standards and require a VDOT-approved traffic signal justification report satisfying the requirements of IIM-TE-387.1 to justify their use as the appropriate traffic control method at the proposed location. The signal justification (including warrants analysis and evaluation of alternatives to signalization) must be uploaded to the SMART Portal as part of the project documentation. If a justification report has not been conducted to show that a signal is the appropriate traffic control method, then the project will be excluded from consideration in scoring and rating for SMART SCALE.

Advanced Signal Controllers

Proposed installation of advanced signal controllers (adaptive, transit pre-emption, etc.) must include a corridor study or operational analysis to meet readiness requirements. The planning study or operational analysis must be uploaded to the SMART Portal as supporting documentation. If a planning study or operational analysis has not been conducted then the project will be screened out for readiness and will be excluded from consideration in scoring and rating for SMART SCALE.

Roadway on New Alignment

An applicant that proposes the construction of a new roadway must provide a planning and/or safety study to support this feature documenting a preferred alternative that is consistent with the scope described in the application. The planning study must include an alternatives analysis that considers improvements, not a new alignment.

New Access Point(s) Adjacent to an Interchange

Minimum spacing standards for commercial entrances and intersections on crossroads near an interchange are defined in Appendix F of the VDOT Road Design Manual. The minimum distance required is 750 feet to the first crossroad entrance on the right from the end of the off-ramp. Additionally, 750 feet is required from the last crossroad entrance on the right to the start of an on-ramp terminal. The minimum distance for a four-legged intersection is 1320 feet from the end of the ramp terminal on the crossroad. There are additional standards for offset entrances and crossovers on the crossroad, and can be obtained in Appendix F. If access management standards are not met, an operational assessment following VDOT's Traffic Operations and Safety Analysis Manual is required to demonstrate that the proposed improvement does not impair interchange operations and safety.

Widening Projects that Add New Through Lane(s)

For the purposes of SMART SCALE applications, a major widening is defined as the addition of two or more general-purpose through lanes. An applicant that proposes a major widening must demonstrate that alternatives to optimize the existing capacity have been evaluated as part of the planning process, and that the alternatives analysis results were used in making the decision on the preferred alternative. The preferred alternative must be consistent with the scope described in the application.

Intersection Reconfigurations

VDOT established the Virginia Intersection and Interchange Control Assessment Program (iCAP) in IIM-TOD-397 to screen intersection and interchange alternatives efficiently and holistically. Virginia iCAP aims to determine the most effective intersection or interchange ramp termini control configuration that improves traffic operations, enhances safety and access management, and accommodates all modes of travel. By implementing this program, VDOT ensures consistency, transparency, and objectivity in the decision-making process.

To meet the requirements of SMART SCALE readiness, applicants must provide documentation demonstrating their adherence to IIM-TOD-397 for any new or modified intersection, along a Corridor of Statewide Significance or VDOT's established Arterial Preservation Network. The required documentation is a completed Virginia iCAP Assessment Tool. This spreadsheet shall be uploaded in the SMART Portal as part of the required project documentation. Additionally, this completed iCAP assessment tool is required for any new traffic signals proposed along VDOT-maintained roadways.

Intersection improvements limited to the following are exempt from this requirement:

- Addition or extension of turn lanes.
- Upgrade of pavement markings or traffic control devices.
- Installation of bicycle or pedestrian accommodations, such as crosswalks, pedestrian signals, sidewalks, shared use paths, or bike lanes.

A VDOT-led study completed before the adoption of the iCAP is considered to be in compliance with this readiness requirement if:

- the study screened a range of intersection designs based on safety, congestion, ped/bike accommodation, and cost;
- a detailed analysis was performed to narrow down and select the preferred alternative; and
- the proposed improvement in the SMART SCALE application is consistent with the study's preferred alternative.

By following the process outlined in IIM-TOD-397, applicants can ensure that their projects align with the program's objectives and contribute to the overall improvement of transportation infrastructure in Virginia.

Uncontrolled Bike and Pedestrian Crossings

When a project includes a new pedestrian crossing at an uncontrolled approach, including mid-block crossings, applicants should review IIM-TE-384.1 to determine the screening and study requirements relevant to the proposed crossing location. All projects with pedestrian crossings at uncontrolled approaches must include a completed SS02 SMART SCALE Uncontrolled Crossing Study document. If the proposed crossing requires an engineering study per IIM-TE-384.1, the SS02 form will fulfill the requirement and support the crossing. If the screening process included in the IIM indicates that the proposed location is not eligible for a marked crosswalk, the feature will be considered ineligible for SMART SCALE funding.

The SS02 form is NOT required for new or improved crossings at signalized intersections or on stop-controlled approaches. For new crossings at stop-controlled approaches, applicants should evaluate the intersection geometry to ensure that the existing STOP bar can be set back far enough to accommodate the crossing while maintaining the minimum safe sight distance.

Park and Ride Project Readiness

Projects that include park and ride lot(s) should include a project sketch that depicts the lot location, lot boundaries, entry and exit points, parking space layout, increase in number of parking spaces, transit circulation, and amenities where applicable. Leased park and ride lots are permitted with the above requirements and a letter of commitment from the parking lot owner.

Transit Project Readiness

Proposed transit projects must demonstrate readiness by providing a detailed cost estimate and any of the following planning documents:

- Completed corridor plan;
- Site plan
- Transit Development Plan (TDP) or Transit Strategic Plan (TSP),
- Comprehensive plan;
- Long-range transportation plan; or
- Federally required planning documents such as NEPA and Section 106

Additionally, the following items must be provided for specific project types:

- For all new fixed guideway service projects: A locally preferred alternative (LPA) must be identified prior to application submission

- For any passenger facility projects that seek funding for land purchases: A feasibility or site selection study
- For any proposed new transit service: A feasibility study identifying route and stop-level ridership projections, route alignment, proposed stops, and a draft schedule. If the project will increase capacity on existing routes, present day ridership is also required. Additionally,a letter of support confirming the availability of operating funds and intent to operate the service is required
- For any projects that include the construction of bus-only lanes: a multimodal plan with an alternatives analysis that documents the bus-only lane as the preferred alternativ

FTA CIG (new starts, small starts, core capacity) program funding will be considered as part of the project funding package if the following conditions have been met:

- FTA has approved the project to enter the formal project development process or the applicant can demonstrate that they are in the process with FTA to enter project development, and
- The applicant has provided a letter acknowledging that they are responsible for any leveraged funding commitment, even if the identified sources of leveraged funding are reduced or become unavailable as specified in **Section 5.3**.

NEPA and Alternatives Analysis

Applicants should provide documentation that the appropriate level of planning, including alternatives analysis and environmental review (NEPA), have been or are being conducted:

- If NEPA is complete, the documentation of FHWA approval (CE, FONSI, ROD) and (if available) a link to the document online shall be uploaded in the SMART Portal as part of the project documentation;
- If NEPA is not complete, then VDOT/DRPT will assess the anticipated level of NEPA document required and the current status using the criteria described in **Appendix G**: **NEPA Analysis Criteria**;
- In the situation where it is determined that the project requires analysis of alternatives, then there must be an identified locally preferred alternative. The applicant must provide the draft NEPA document (if available), which must document the locally preferred alternative. The NEPA Concurrence form signed by FHWA must be uploaded to the SMART SCALE Portal.
    - The preferred alternative must be identified in the application. If more than one alternative is listed, the State will request the applicant to modify the

application to identify the preferred alternative. If the applicant is unable to identify preferred alternative, then the State will deem project not ready and will screen project out from consideration.

- In the situation where it is determined that an alternatives analysis is not required, VDOT/DRPT will provide the applicant with documentation of such determination prior to application submission.

Public Support

Applicants must demonstrate that a project has the support of key stakeholders, and that the public has been afforded the opportunity to provide comments and input at the time of application submittal to SMART SCALE. A resolution of support from the relevant governing body or policy board, approved in a public forum with adequate public notice and within one year of the application in question, is required at the time of application. The resolution of support must be uploaded in the SMART Portal as part of the project documentation. There are two elements of public support eligibility:

- Public Support: Every application must have a resolution of support from its governing body; In the case of an application that traverses the submitting entity's boundaries, the submitting entity must provide resolution(s) of support from the affected jurisdiction(s) or regional planning organization(s); and
- Eligibility to Submit Applications/Regional Support: For locality and transit-submitted project applications located within an MPO area, the project must have a resolution of support from the MPO. Projects within established MPO study areas that are identified in or consistent with the regionally adopted Constrained Long Range Plan (CLRP) do not require a resolution of support from the respective MPO Policy Board.

Data Responsibility

Table 2.7 lists the types of information needed to calculate the prioritization measures and highlights which items are calculated based on information provided by the applicant and which items are compiled or calculated by the Commonwealth. The online application tool is electronic and map-based to facilitate an automated population of key data elements. This has the potential to reduce the likelihood of data entry errors and improve consistency with VDOT's current scoping form.

Table 2.7 SMART SCALE Measure Data Responsibility

	Responsibility	
All Measures	**State**	**Applicant**
Detailed description of improvement		X
Project location		X
Safety		
S.1 - Reduction in number of Fatal and Injury crashes	X	
S.2 - Reduction in Fatal and Injury crash Rate	X	*
Congestion Mitigation		
C.1 - Increase in Person Throughput	X	*
C.2 - Decrease in Person Hours Delay	X	*
Accessibility		
A.1 - Increase Access to Jobs	X	
A.2 - Access to jobs for disadvantaged population	X	
A.3 - Checklist of multimodal elements (transit, bike/ped, park and ride)		X
A.3 - Number of non-SOV users	X	*
Environment		
E.1 - Checklist of project elements that contribute to reduced pollutant emissions and/or energy use (transit, bike/ped, park and ride, energy-efficient facilities, etc.)		X
E.1 - Location of improvement on roadways with truck use > 8%	X	
E.1 - Improvements that benefit freight rail or intermodal facilities		X
E.2 - Acres of natural and cultural resources potentially impacted	X	
Economic Development		
ED.1 - Verify with VEDP that desired properties are listed in the VirginiaSCAN database		X
ED.2 - Improves access to distribution, intermodal and manufacturing facilities	X	
ED.2 - Improves STAA truck route	X	
ED.2 - Enhances access or reduces congestion at ports/airports	X	
ED.2 - Tonnage (1000s) per day	X	
ED.3 - Travel time reliability	X	
Land Use and Transportation Coordination		
L.1 – Transportation efficient land use	X	
L.2 – Increase in transportation efficient land use	X	

* On non-VDOT roadway facilities, the applicant will need to provide study traffic data (existing turning movement counts). For non-roadway (transit, park and ride, bike/ped) projects, the applicant will need to provide existing year peak period usage. Bus ridership counts should also be provided for roadway improvements on segments with significant transit use.

* Applicants are encouraged to provide supplemental data and analysis but will not be required.

3.0 Evaluation Measures

This section summarizes the evaluation measures used in the SMART SCALE evaluation process and the methods by which those evaluation measures are calculated. SMART SCALE legislation requires that the measures be quantifiable and objective, that the analysis of a project's benefits is relative to its cost and that the CTB consider all modes of transportation. The law requires that the measures fall into six factor areas, listed below:

- Safety;
- Congestion Mitigation;
- Accessibility;
- Environmental Quality;
- Economic Development; and
- Land Use Coordination (for areas over 200,000 populations).

Using the framework of the six factor areas, VDOT and DRPT used an extensive process to develop the measures for SMART SCALE. The team researched best practices from other state DOTs and MPOs, established a work group focused on measures, held a peer exchange workshop, and conducted lessons learned tasks from the initial rounds of SMART SCALE. From these working groups and activities, the team gained a key understanding of some guiding principles that should be included in SMART SCALE, formalized into six guiding principles:

- Analyze what matters to people and has a meaningful impact;
- Ensure fair and accurate benefit-cost analysis;
- Be both transparent and understandable;
- Work for both urban and rural areas;
- Work for all modes of transportation; and
- Minimize overlap between measures.

3.1 SAFETY MEASURES

The SMART SCALE safety measures evaluate how each project addresses multimodal transportation safety concerns through implementation of best practice crash reduction strategies. Listed below in **Table 3.1** are brief summaries of the two measures. Additional information about the measures, methodologies and other details are available in Appendix A.

Table 3.1 Safety Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
S.1	EPDO of Fatal and Injury Crashes	Equivalent property damage only (EPDO) of fatal and injury crashes expected to be avoided due to project implementation	Estimate the number of fatalities and injury crashes (weighted by EPDO) at the project location and the expected effectiveness of project-specific counter-measures in reducing crash occurrence	70%*
S.2	EPDO Rate of Fatal and Injury Crashes	EPDO of fatal and injury crashes per 100 million vehicle miles traveled (VMT) expected to be avoided due to project implementation	Similar to S.1, but focusing on the change in fatality and injury crashes (weighted by EPDO) per VMT. The measure considers projects that address areas with a high rate of crashes that may be outside of high-volume roadways	30%

* Weighted at 100% for Transit and Transportation Demand Management projects.

3.2 CONGESTION MITIGATION MEASURES

The SMART SCALE congestion mitigation measures evaluate how each project addresses the ability of the transportation system to move people and reduce travel delay across the State. Listed below in **Table 3.2** are brief summaries of the measures. Additional information about the measures, methodologies and other details are available in Appendix B.

Table 3.2 Congestion Mitigation Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
C.1	Person Throughput	Increase in corridor total (multimodal) person throughput attributed to the project	Assess the potential benefit of the project in increasing the number of users served within the peak period.	50%
C.2	Person Hours of Delay	Decrease in the number of person-hours of delay in the corridor	Assess the potential benefit of the project in reducing peak-period person-hours of delay.	50%

3.3 ACCESSIBILITY MEASURES

The SMART SCALE accessibility measures evaluate how each project addresses worker and overall household access to jobs and other opportunities, as well as multiple and connected modal choices. Listed below in **Table 3.3** are brief summaries of the measures, and additional information is available in Appendix C.

Table 3.3 Accessibility Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
A.1	Access to Jobs (Total Population)	Change in average jobs accessibility within 45 minutes by driving (within 60 minutes for transit, bicycle and pedestrian projects)	Measure assesses the average change in access to employment opportunities as a result of project implementation based on the GIS accessibility tool.	60%
A.2	Access to Jobs (Disadvantaged Populations)	Change in average jobs accessibility for disadvantaged populations within 45 minutes by driving (within 60 minutes for transit, bicycle and pedestrian projects)	Measure assesses the average change in access to employment opportunities as a result of project implementation based on the GIS accessibility tool.	20%
A.3	Access to Multimodal Choices	Assessment of the project support for connections between modes and promotion of multiple transportation choices	Measure assigns more points for projects that enhance interconnections among modes, provide accessible and reliable transportation for all users, encourage travel demand management, and potential to support emergency mobility.	20%

3.4 ENVIRONMENTAL QUALITY MEASURES

The two SMART SCALE environmental quality measures evaluate how projects address the reduction of pollutant emissions and energy consumption and minimize the impact on natural and cultural resources. Listed below in **Table 3.4** are brief summaries of the measures, and additional information is available in Appendix D.

Table 3.4 Environmental Quality Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
E.1	Air Quality and Energy Environmental Effect	Potential of the project to improve air quality and reduce greenhouse gas emissions	Measure rates a project's potential benefit to air quality by project benefits to non-SOV and freight users, applying a user-based point system and a carbon dioxide offset calculation.	100%
E.2	Impact to Natural and Cultural Resources	Potential of the project to minimize impact on natural and cultural resources located within project buffer	Measure evaluates how much sensitive land would be affected within the project buffer around the project. Points are subtracted from the final score based on total potential sensitive acreage impacted.	(*)

* Up to 5 points subtracted from final score based on the total potential sensitive acreage impacted

3.5 ECONOMIC DEVELOPMENT MEASURES

The SMART SCALE economic development measures evaluate how each project addresses regional and local economic development plans and new development activity, as well as improvements to intermodal freight movement access and efficiency and travel time reliability to support the movement of goods and people. Listed below in **Table 3.5** are brief summaries of the measures. Additional information about the measures, methodologies and other details are available in Appendix E.

Table 3.5 Economic Development Measures

ID	Measure Name	Measure Description	Measure Objective	Measure Weight
ED.1	Project Support for Economic Development	Project's potential to directly support economic development.	This measure evaluates the support of sites that will attract growth industries using an inventory captured in VEDP's VirginiaScan real estate database that will include evaluation of job creation potential, capital investments in sites, and estimation of the potential market demand of sites by including site visits.	60%
ED.2	Intermodal Access and Efficiency	Rate projects based on the extent to which the project is deemed to enhance access to critical intermodal locations, interregional freight movement, and/or freight intensive industries	This measure assesses the following: • Level to which the project enhances access to distribution centers, intermodal facilities, manufacturing industries or other freight intensive industries; • Level to which the project supports enhanced efficiency on a primary truck freight route (or high volume/high-value truck or rail freight corridor); • Level to which the project enhances access or reduces congestion at or adjacent to VA ports/ airports The scoring value is scaled by the length of the project.	20%
ED.3	Travel Time Reliability	Improvement in travel time reliability attributed to the project	This measure determines the project's expected impact on improving reliability which supports efforts to retain businesses and increase economic activity.	20%

3.6 LAND USE COORDINATION MEASURES

The coordination between transportation and land use is an important issue within jurisdictions throughout Virginia. SMART SCALE legislation mandates the use of this factor area for metropolitan areas in the Commonwealth with a total population of 200,000 or more. The goals of the SMART SCALE land use coordination measures are to improve the consistency of the connection between local comprehensive plan goals for transportation-efficient land use and transportation infrastructure design, multimodal accommodation, and system operations. Listed in **Table 3.6** is a brief summary of the land use measures, and additional information is available in Appendix F.

Table 3.6 Transportation Efficient Land Use Measure

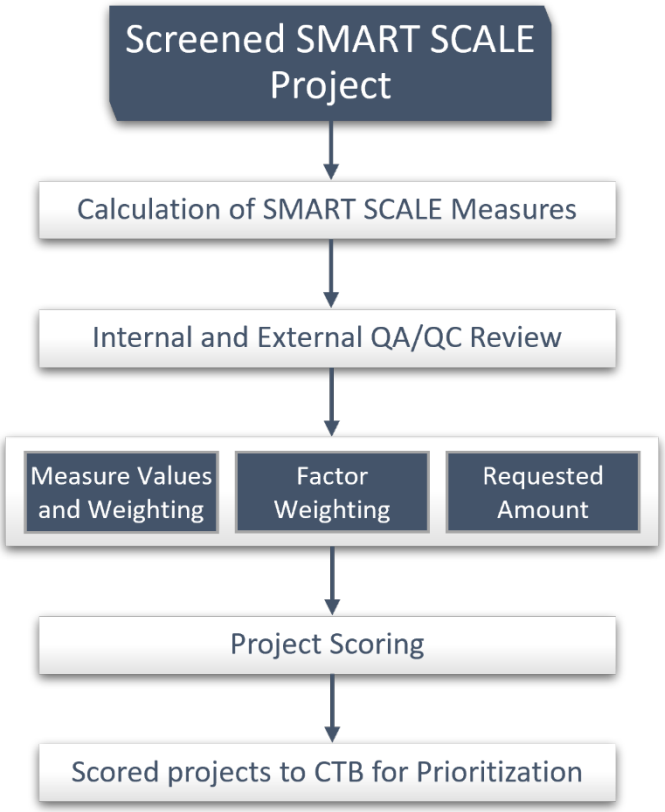
ID	Measure Name	Measure Description	Measure Objective	Measure Weight
L.1	Transportation Efficient Land Use	Amount of population and employment located in areas with high non-work accessibility	This measure determines the degree to which the project supports population and employment that on average has a reduced impact on the transportation network	(*)
L.2	Increase in Transportation Efficient Land Use	Increase in amount of population and employment located in areas with high non-work accessibility between present-day and the horizon year of 2030	This measure determines the degree to which the project supports population and employment that on average has a reduced impact on the transportation network	(*)

* Up to 100% added to final score based on normalized measure performance

4.0 Project Evaluation and Rating

This section summarizes how projects are evaluated once submitted and screened in for consideration in the SMART SCALE process. The CTB's goal is to ensure a transparent process that allows the public and stakeholders to understand how the project benefit for each project is determined and hold decision makers accountable. The flowchart in **Figure 4.1** below illustrates the general process of SMART SCALE project evaluation and rating and will be explored in more detail within this section.

Figure 4.1 SMART SCALE Project Evaluation Process



4.1 Calculation of SMART SCALE Measures

The technical evaluation team collects and calculates measures listed in **Section 3.0** Evaluation Measures, spanning the six factor areas. This is an open process that involves state agency collaboration and review from an external team of stakeholders to ensure transparency and improve consistency. Methodologies and specific evaluating methods are listed in Appendix A-F for each of the factor areas.

4.2 INTERNAL/EXTERNAL REVIEW

A key step in the rating process is to perform a quality assurance/quality control (QA/QC) review of the calculated measures for each project. This review will be conducted by internal and external technical groups. Measures generated through a GIS-based analysis (i.e., environmental factor) or based on responses from the applicant are not subject to the QA/QC review.

The internal technical evaluation team, led by OIPI in cooperation and coordination with VDOT and DRPT staff, is responsible for calculating and evaluating submitted projects in the SMART SCALE process. Duties of this group include:

- Validating and screening projects;
- Calculating measure values for submitted projects according to the methodologies set out in the Appendices; and
- Identifying any inconsistencies.

Once the initial analysis is done, a blind secondary analysis is performed on a minimum of 10 percent of the applications. Projects are randomly chosen for a blind secondary evaluation. A member of the technical evaluation team not involved in the initial analysis conducts the blind independent evaluation to ensure consistency in the development of assumptions and application of analytical methods and to identify process improvements.

4.3 FACTOR WEIGHTING

The SMART SCALE legislation recognized the diversity of transportation needs in different areas of the Commonwealth. It states:

"The Commonwealth Transportation Board shall weight the factors used in subdivision 1 for each of the state's highway construction districts (9). The Commonwealth Transportation Board may assign different weights to the factors, within each highway construction district, based on the unique needs and qualities of each highway construction district."

"The Commonwealth Transportation Board shall solicit input from localities, metropolitan planning organizations, transit authorities, transportation authorities, and other stakeholders in its development of the prioritization process pursuant to this section. Further, the Board shall explicitly consider input provided by an applicable metropolitan planning organization or the Northern Virginia Transportation Authority when developing the weighting of factors pursuant to subdivision 3 for a metropolitan planning area with a population over 200,000 individuals."

"The Commonwealth Transportation Board, pursuant to subdivision B.3 of § 33.2-214.1 as created by this act, shall ensure that congestion mitigation, consistent with

§ 33.2-257 of the Code of Virginia, is weighted highest among the factors in the prioritization process."

Based on a robust public involvement process, it was determined that needs within each construction district are often diverse as well. The CTB created four weighting frameworks and assigned frameworks by planning district commission (PDC) and metropolitan planning organization (MPO) boundaries. **Table 4.1** and **Figure 4.2** present the final factor weighting categories assigned to each MPO and PDC area.

Figure 4.2 PDC and MPO Factor Weighting Typology Map

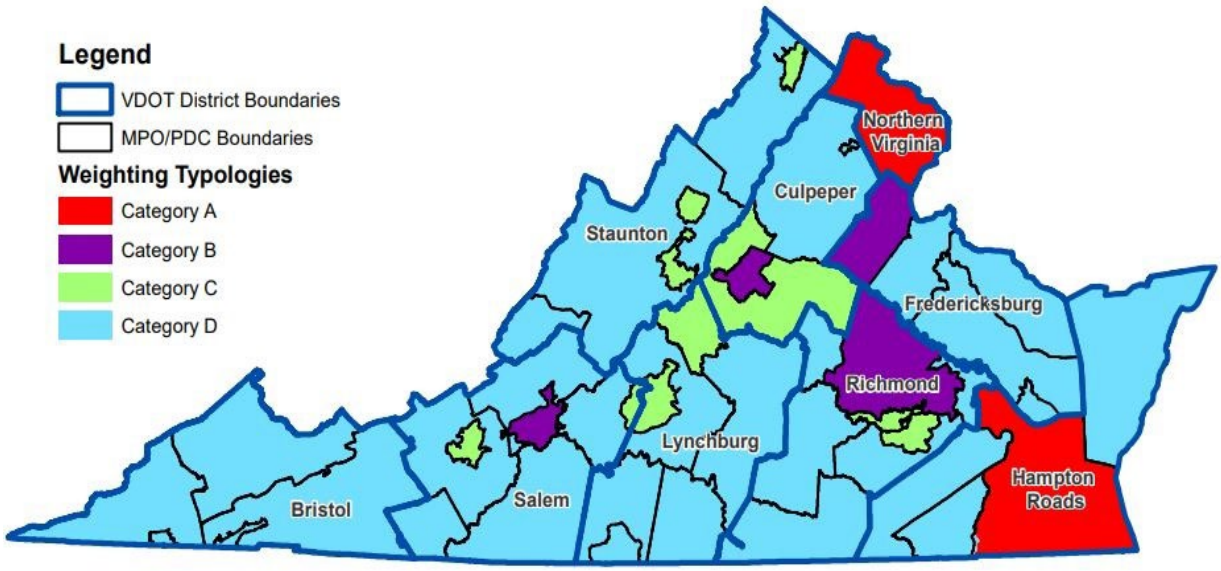


Table 4.1 PDC-MPO Factor Weighting Typology

Name	Typology
Accomack-Northampton PDC	Category D
Bristol MPO	Category D
Central Shenandoah PDC*	Category D
Central Virginia MPO	Category C
Charlottesville-Albemarle MPO	Category B
Commonwealth RC	Category D
Crater PDC*	Category D
Cumberland Plateau PDC	Category D
Danville MPO	Category D
Fredericksburg Area MPO (FAMPO)	Category B
George Washington RC*	Category D
Hampton Roads PDC[i]	Category D
Hampton Roads TPO (HRTPO)[i,ii]	Category A
Harrisonburg-Rockingham MPO	Category C
Kingsport MPO	Category D
Lenowisco PDC	Category D
Middle Peninsula PDC[ii]	Category D
Mount Rogers PDC*	Category D
New River Valley MPO	Category C
New River Valley PDC*	Category D
Northern Neck PDC	Category D
Northern Shenandoah Valley RC*	Category D
Northern Virginia RC (NVRC)	Category A
Northern Virginia Transportation Authority (NVTA)/ Transportation Planning Board (TPB)[iii]	Category A
Rappahannock-Rapidan RC[iii]	Category D
Region 2000 LGC*	Category D
Richmond Regional PDC*	Category D
Richmond Regional TPO (RRTPO)	Category B
Roanoke Valley TPO (RVTPO)	Category B
Roanoke Valley-Alleghany PDC*	Category D
Southside PDC	Category D
Staunton-Augusta-Waynesboro MPO	Category C
Thomas Jefferson PDC*	Category C
Tri-Cities MPO	Category C
West Piedmont PDC*	Category D
WinFred MPO	Category C

*Note: PDC is defined as the remainder of the region outside the MPO boundary. In many cases, these regions include partial counties (e.g., Goochland County is partially within RRTPO and the Richmond Regional PDC). If a project is within the MPO boundary in a partial county, the project shall use the weighting associated with the MPO with the following exceptions:

i. The portion of Southampton County and the City of Franklin within the Hampton Roads TPO boundary shall use the weighting associated with the Hampton Roads PDC.
ii. Gloucester County portion of HRTPO included within Middle Peninsula PDC typology.
iii. Fauquier County portion of TPB included within Rappahannock-Rapidan RC typology.

The final weighting scheme by category is presented in **Table 4.2**. Where MPO boundaries cover a partial county, the assumption is that any project partially or wholly within the MPO boundary will use the assigned MPO weighting approach unless noted otherwise in **Table 4.1**. For projects that cross multiple typologies, the weighting framework from the typology for which the majority of the footprint of the project is located will be utilized.

Table 4.2 Factor Weights by Category

Factor	Safety	Congestion Mitigation	Accessibility	Land Use	Economic Development	Environmental Quality
Category A	15%	45%*	25%	**	5%	10%
Category B	20%	25%	25%	**	20%	10%
Category C	30%	20%	15%	**	25%	10%
Category D	40%	10%	10%	**	30%	10%

* For Northern Virginia and Hampton Roads construction districts, congestion mitigation is weighted highest among the factors in the prioritization process.

** Up to 100% added to the benefit score based on normalized measure performance

4.4 PROJECT COST

SMART SCALE (§ 33.2-214.1) mandates that the prioritization process be based on the benefit of a project relative to the cost of the project. In accordance with the CTB policy, the SMART SCALE score is based on the benefit of the project relative with the requested SMART SCALE funds, also known as the SMART SCALE cost.

For purposes of determining the SMART SCALE score, only the funds requested from SMART SCALE programs – the High Priority Projects Program and the District Grant Program – are considered. Information on a project's benefits relative to total cost will be provided to the CTB for comparison purposes.

Using only the funds requested from SMART SCALE programs directly accounts for the benefit of private, local, or other leveraged funding and helps augment limited state and federal funding sources.

This policy encourages applicants to bring resources to the table.

4.5 PROJECT SCORING

SMART SCALE requires an analysis of the project benefits, considering each applicable factor relative to the project's cost. Each project's benefit is determined by calculating values for each of the evaluation measures, converting those values into a normalized value for each factor (0 to 100 scale), and then by weighting the factor values according to one of several potential weighting frameworks approved by the CTB. Ultimately, a Project Benefit is divided by the amount of funds requested from the SMART SCALE programs to obtain the final SMART SCALE score used to rank projects and develop the staff-recommended funding scenario. In addition, the Project Benefit is divided by the total cost of the project, and this figure is provided to the CTB for information purposes.

Key Terms

Measure Value – Data calculated for the project that describes the characteristics of the project. Wherever possible, the SMART SCALE measure values should be calculated, so they are proportional to the size or impact of the project, even for qualitative measures.

Normalized Measure Value – Numerical value given to each measure based on the Measure Value as a percentage of the maximum or best Measure Value in the state (in other words, scoring based on proportion of the highest Measure Value).

Weighted Normalized Measure Value – Normalized Measure Values within a factor area multiplied by their measure weights.

Factor Value – Sum of the Weighted Relative Measure Values within a factor area.

Weighted Factor Value – Factor Value multiplied by the factor weight of the appropriate weighting framework based on the project location.

Project Benefit – Sum of the Weighted Factor Values for each factor area. This represents the total benefits of the project relative to other projects' benefits.

SMART SCALE Score (Project Benefit / SMART SCALE Cost) – Project Benefit divided by the SMART SCALE-funded cost of the project. This index allows projects to be compared to each other in terms of their benefit per SMART SCALE dollar invested. Project costs are applied in units of tens of millions of dollars ($10 million).

Methodology

Step 1: Within each factor, for each measure, the highest Measure Value is determined after calculating the measures for each project. The highest Measure Value is given a value of 100. Other Measure Values are compared to the highest Measure Value. The Normalized Measure Value is then established by taking the project Measure Value as a percentage of the highest value. An example of normalization is shown in **Table 4.3** below.

Table 4.3 Normalization of Measure Weights

	Project 1	Project 2	Project 3	Project 4
Measure Value	11.62 hours	166.45 hours	1332.85 hours	21131.65 hours
Normalized Measure Value	0.05	0.79	6.31	100.00

Step 2: Once each Normalized Measure Value has been assigned for a factor, the measure weighting is applied. Each measure within the six factors has a measure weight which determines the proportion of the Factor Value carried by each measure. Once the measure weighting has been applied, the sum of the Weighted Normalized Measure Values produces the Factor Value. **Table 4.4** presents an example for the Congestion Mitigation factor area.

Table 4.4 Applying Measure Weights

	C.1: Person Throughput		C.2: Reduction in Person Hours of Delay		Raw Factor Value: Congestion
Measure Weight	50%		50%		
	Value	Normalized Value	Value	Normalized Value	
Project 1	5	0.01	11	0.05	(50% * .01) + (50% * .05) = .03
Project 2	747	1.40	166	0.80	(50% * 1.4) + (50% * .80) = 1.1
Project 3	182	0.34	1,332	6.30	(50% * .34) + (50% * 6.31) = 3.32
Project 4	53,200	100.00	21,131	100	(50% * 100) + (50%*1000) = 100

Step 3: The Factor Value is then multiplied by the weighting percentage assigned to that factor by the predetermined weighting typology. **Table 4.5** demonstrates this factor weighting using example project 2 and the Category A weights. This process is repeated for all applicable factors, their sum producing the Project Benefit. The Project Benefit sum is 1.33 (i.e., 0.62+0.50+0.05+0.13+0.03 = 1.33).

Step 4: The Land Use Factor Value is not weighted by a typology-based value. The Factor Value is converted to a Land Use Multiplier by dividing the value by 100 and adding 1. This multiplier is applied to the Project Benefit sum to return the Final Project Benefit. The Multiplier is 1.73 (i.e., 1+[73.2/100] = 1.73) and the Final Project Benefit is 2.3 (i.e., 1.33 * 1.73 = 2.30).

Table 4.5 Applying Factor Weights

Project 2 (Category A Weights)	Safety	Congestion Mitigation	Accessibility	Economic Development	Environmental Quality	Land Use	Final Project Benefit
Weight	15%	45%	25%	5%	10%	(*)	
Factor Value	4.1	1.1	0.2	2.6	0.3	73.2	
Weighted Value	0.62	0.50	0.05	0.13	0.03	x1.73(*)	2.30

* Up to 100% (x2) multiplied by the benefit score based on normalized measure performance

Step 5**:** The Project Benefit is then divided by the SMART SCALE-funded cost of the project (in $10 millions) to determine the value of the benefit for every dollar invested. For example, assume that Project 2 is requesting $12.4 million in SMART SCALE funds out of a total cost of $20 million. The Project Benefit is 2.30, and the SMART SCALE Score would be 1.85 (i.e., 2.30/1.24 = 1.85).

The Project Benefit is also divided by the total project cost to provide supplemental information on the cost-effectiveness of each project. If the total project costs were used, instead of SMART SCALE funds only, the cost-effectiveness of Project 2 would be 1.15 (i.e., 2.30/2 = 1.15).

Everything is Relative

Under this process, the maximum measure values may change on a year-to-year basis depending on the characteristics of the submitted projects. This method aims to score each project on a scale proportional to its benefits and relative to its cohort of projects rather than an arbitrary scale that defines whether a project does well or not.

In the first round of SMART SCALE, the Transform66: Outside the Beltway project received the highest measure value in the congestion factor with a 100. In that same round, the I-64 High Rise Bridge and Widening project received a 24.3. In the second round of SMART SCALE without the Transform66: Outside the Beltway project, the I-64 High Rise Bridge and Widening project received a 94.5 measure value for the congestion factor – the highest value. The benefits of the I-64 High Rise Bridge and Widening project did not quadruple, rather as the evaluation is done on a relative basis, the benefit increased because it did the most to reduce congestion of the projects submitted in the second round of SMART SCALE.

Figure 4.3 summarizes the calculation of the SMART SCALE Score for the Project 2 example described above. This shows how the measure values and weights, combined with the factor weights, can be used to calculate the Project Benefit. The SMART SCALE Score is the Project Benefit divided by the SMART SCALE cost. Once all projects have been evaluated, they are sorted (ranked) based on the highest scored to lowest scored projects.

Project Segmentation – Fixed Guideway Projects (Transit and Rail Only)

Some projects are submitted for SMART SCALE that is a segment of a larger project plan. The individual project may not deliver certain benefits, but the larger project will have significant benefits if each of the individual components is built. For example, if a project is submitted to extend a platform at a rail station to allow longer trains to be utilized, the benefits for just the extended platform will be very limited. To account for future benefits of projects that are segmented, a percentage of the benefits derived from all segments of a larger plan will be used in the evaluating of a specific segment. In our example, assuming the rail platform cost $10 million, and the future purchase of railcars cost $90 million for a total cost of $100 million, benefits would be measured for the total project, and the segmented component would receive a pro-rata percentage of the benefits relative to the component's cost to the total project's cost. In this instance, 10% ($10 million/$100 million) of the benefits would be used for evaluating the platform project as this component represents 10% of the overall cost of the total project. [1]

Figure 4.3 Calculate SMART SCALE Score

SMART SCALE Area Type A															
Factor	Congestion Mitigation		Safety		Accessibility			Economic Development			Environment		Land Use	
Measure	Increase in Peak Period Person Throughput	Reduction in Peak Period Delay	Reduction in Fatal and Injury Crashes	Reduction in Fatal and Injury Crash Rate	Increase in Access to Jobs	Increase in Access to Jobs for Disadvantaged Populations	Increase in Access to Multimodal Travel Choices	Square Feet of Commercial/Industrial Development Supported	Tons of Goods Impacted	Improvement to Travel Time Reliability	Potential to Improve Air Quality	Other Factor Values Scaled by Potential Acreage Impacted	Transportation-Efficient Land Development	Increase in Transportation-Efficient Land Development
Measure Value	747.0 persons	166.4 person hrs.	21.0 EPDO	2033.5 EPDO / 100M VMT	5.2 jobs per resident	2.1 jobs per resident	50 adjusted users	5,863.0 thousand adj sq. ft.	92,359.5 thousand adj daily tons	2,493,615.0 adj. buffer time index	0.1 adjusted points	0 scaled points	52.0 access * pop/emp density.h	52.7 access * pop/emp density change
Normalized Measure Value (0-100)	1.4	0.8	3.4	5.7	0.2	0.0	0.2	3.9	0.8	0.4	0.3	0.0	72.5	73.2
Measure Weight (% of Factor)	0.5	0.5	0.7	0.3	0.6	0.2	0.2	0.6	0.2	0.2	1	Up to -5 Points*	0.5	0.5
Factor Value	1.1		4.1		0.2			2.6			0.3		73.2	
Factor Weight (% of Project Score)	45%		15%		25%			5%			10%		*	
Weighted Factor Value	0.5		0.62		0.05			0.13			0.03		x1.73(*)	
Project Benefit	2.3													
SMART SCALE Cost	$12,400,000													
SMART SCALE Score (Project Benefit per $10M SMART SCALE Cost)	**1.85**													

[1] This has very limited applicability and does not apply to roadway widening

5.0 CTB Prioritization and Programming

This final section summarizes CTB prioritization and programming methods that are used in the SMART SCALE process, specifically how SMART SCALE scored projects are reviewed and ultimately incorporated into the SYIP. The flowchart in **Figure 5.1** below illustrates the basic process of the final stages of the SMART SCALE Biennial Process, in which the CTB begins with the results from the SMART SCALE evaluation and rating process, and the staff recommended funding scenario to inform funding decisions for the draft SYIP.

Figure 5.1 Prioritization and Programming Process (Odd Years)

First, the SMART SCALE technical review team presents the screening and scoring results to both the CTB and the public. Pursuant to Section 33.2-214.2 of the Code of Virginia, project values will be made publicly available no later than 150 days prior to the CTB's vote to adopt the Six-Year Improvement Plan. Under current practices, this requires that the results be released at the January CTB meeting. The CTB gives guidance on program development and begins to narrow down their funding decisions for projects that will be funded in the draft SYIP. Their decisions

are represented in the draft SYIP. After the draft SYIP is presented, the CTB holds a public comment period that allows eligible entities to comment on the process, screening decisions, and evaluating individual projects. The CTB takes into account public comments based on the draft SYIP, ultimately approving the final SYIP in June.

5.1 FUNDING DECISIONS FOR DRAFT SYIP

Pursuant to Section 33.2-214 of the Code of Virginia, each year, the CTB must approve a capital improvement program that outlines planned spending for transportation projects for proposed construction development or study for the next six years. The SYIP covers all surface transportation projects, including highway, transit, rail, roadway, technology operational improvements, and transportation demand management strategies. Project funding is programmed in accordance with project schedules and cash flow requirements. The CTB updates the SYIP each year as revenue estimates are updated, priorities are revised, project schedules and costs change, and study results are known.

Information from the fall transportation meetings and results of the evaluation process are utilized by the CTB to direct the development of a draft SYIP. The draft SYIP is presented to the CTB each spring. At that time, the draft SYIP is made available for public comment. A final SYIP is presented to the CTB in June each year for approval. To meet its statutory obligation, the CTB will adopt a SYIP in June of each year effective July 1st, though SMART SCALE will only happen every other year (see **Section 1.5**).

Once the scoring is complete, OIPI develops a staff-recommended funding scenario determined as follows:

Step 1: Fund top scoring projects within each district based on SMART SCALE Score eligible for Highway Construction District Grant Program funds using Highway Construction District Grant Program funds until the remaining funds are insufficient to fund the next highest scoring project.

Step 2: Fund remaining top scoring projects statewide based on SMART SCALE Score for High Priority Projects Program funds using High Priority Projects Program funds until the remaining funds are insufficient to fund the next highest scoring project.

Remaining balances will be reserved to address budget adjustments on selected projects according to the thresholds established in the SMART SCALE Prioritization Process or reserved for allocation in a subsequent round.

The CTB may modify the staff-recommended funding scenario. Additional considerations that may be used by the CTB include:

- Public feedback from Fall Transportation Meetings and Spring public meetings;
- SMART SCALE scores;

- Project segmentation – starting the next phase of a multi-segment roadway improvement, e.g., to complete a major multi-segment project; and
- Applicant delivery performance as reported by Local Assistance Division.

The prioritization process does not require that the CTB fund projects in order of their scores. Further, the CTB is not required to select the highest scoring project. The process is a means to assist the CTB in evaluating and comparing proposed improvements. The CTB continues to retain final decision-making authority on improvements to be included in the SYIP.

5.2 PUBLIC COMMENT PERIOD

The CTB provides numerous opportunities for the public to provide input on transportation projects and priorities as part of the continuing transportation planning process. The CTB holds periodic public outreach meetings in the construction districts, providing public and elected officials with an opportunity to identify transportation priorities and to review and comment on the current SYIP. VDOT and DRPT also hold an annual planning and programming meeting inviting representatives from all MPOs and PDCs to attend and provide their transportation priorities prior to the annual development of the SYIP.

Stakeholders have the opportunity to provide input as to what projects the jurisdictions/MPOs/PDCs/transit agencies should consider moving forward in the process through the development of an application for SMART SCALE funds as well as by providing feedback to the CTB during the periodic public meetings. Stakeholders may work with the state to ensure that projects are defined in sufficient detail for SMART SCALE evaluation. All of the applications and supporting analysis will be posted on the SMART SCALE website and made available for public review prior to scoring. Public input at this stage is critical to ensuring that no pertinent issues or options are overlooked in the development of a project application. By January of each SMART SCALE cycle, the evaluation of projects selected for SMART SCALE prioritization evaluation will be complete, and results will be made public. Stakeholders have the opportunity to review assumptions and calculations and see each project's score.

Each spring, the draft SYIP is made available for public comment and CTB hosts a public hearing in each construction district. Attendance at CTB public outreach meetings generally includes elected state officials, city and town officials, County Boards of Supervisors, representatives of advocacy groups, representatives from MPOs and PDCs, and the general public. Comments are accepted both verbally and in writing at the meeting or via regular mail or email after the meeting.

5.3 PROCESS ISSUES

The CTB adopted an updated SYIP policy on December 7, 2016, with changes to the programming process intended to improve transparency in the programming

process, increase certainty for local project sponsors, citizens, and businesses, and accelerate delivery of selected projects. This policy document outlines key provisions in the following areas:

- Frequency of updates to programs in the SYIP and to HPP and DGP;
- Changes relating to modification of the amounts of funds previously committed and programmed to projects under certain programs;

All SMART SCALE projects selected for funding under the HPP and the DGP (enacted as Code of Virginia § 33.2-370 and § 33.2-371,) must be fully funded and demonstrate the Board's commitment to advance the project through construction.

Fully funding a project means all funding for the project must be identified to fully fund the total cost of the project at the time of inclusion in the SYIP and within the six-year window of the SYIP.

The Board will be presented with a staff-recommended scenario based on project scores to guide the allocation of funds in the draft SYIP and consider modifications to the staff-recommended scenario to form the consensus scenario to guide the allocation of funds in the final SYIP.

Some of the specific process issues pertaining to SMART SCALE are outlined below.

Project Changes Post-Selection and SYIP Approval

In general, once a project has been screened, evaluated, and selected for funding, it will remain in the SYIP as a funding priority. However, changes to a project's scope or budget may require engagement in the SMART SCALE project change process.

The project change process was developed to ensure the integrity of the SMART SCALE scoring process, the original intent/benefits of evaluated projects, and the CTB's allocation decisions. Changes to basic project elements, such as scope or cost, could result in funding projects that are not as cost effective as others.

The project change process was designed to be flexible, allowing for most project modifications to be addressed through business rules without requiring CTB action, thereby avoiding potential project delays. More information about SMART SCALE project changes can be found in the SMART SCALE Project Change Guide.

A project that has been selected for funding must be reviewed through the project change process if there are significant changes to either the scope or cost of the project:

1. If proposed project scope changes will change the nature of the project as presented in the project's SMART SCALE application, then a preliminary review of the proposed changes will be conducted to determine if there is an impact to project benefits. If the project benefits may be impacted, then a quantitative assessment will be conducted to determine the level of impact. If warranted, the project will be re-scored utilizing the same methodology and

maximum measure values for the round of SMART SCALE in which the project was selected for funding. In this case, if the revised score is less than the lowest-ranked funded project in the district for that round of SMART SCALE and would not have been funded, CTB action is required to approve the change in scope.

The CTB may opt to approve the project change, deny the project change or cancel the project. In such cases of cancellation, the remaining SMART SCALE funds will be reserved to address budget adjustments on existing SMART SCALE projects or reserved for allocation in the next solicitation cycle for SMART SCALE. Results of SMART SCALE project scope changes reviewed by the CTB will be made publicly available.

If the proposed scope change is an increase in scope, the applicant is responsible for the additional cost attributable to the increase in scope regardless of budget impact.

2. If an estimate increases prior to project advertisement or contract award and exceeds the following thresholds shown in **Table 5.1**, and the applicant is not funding the increased cost with other funds, CTB action is required to approve the budget increase:

Table 5.1 Project Budget Change Thresholds for CTB Action

Total Project Budget	Change from original SMART SCALE requested amount
Less than $5,000,000	20% or greater increase in funding requested
From $5,000,000 to $10,000,000	$1,000,000 or greater increase in funding requested
Greater than $10,000,000	10% or greater increase in funding requested; $5,000,000 maximum increase in funding

3. To address cost estimate increases both within the threshold and beyond the threshold, funds will be reprogrammed from projects with surplus allocations due to estimate decreases, contract award savings, schedule changes, etc., or from future SMART SCALE funds from the applicable grant program (DGP or HPP). Regular reviews will be conducted to ensure that the scope and benefit of selected projects have not changed significantly. Project estimates will also be monitored to determine if the thresholds need to be adjusted. See **Post Selection SYIP Allocations** section below for additional information about surplus funding.

Changes in Leveraged Funding

The applicant is responsible for a leveraged commitment, even if the identified sources of leveraged funding are reduced or become unavailable. As discussed in **Section 2.0**, an applicant may only identify State of Good Repair, Transportation Alternatives Set-Aside, Virginia Highway Safety Improvement Program and Revenue Sharing funds as committed funds if the funding has already been approved by the CTB. Applicants must have an approved or pending application

for other sources of committed funds, such as local/regional or other federal funds, at the time of the SMART SCALE application submission.

Re-Submittal of Projects

If a submitted project is not selected for funding during a cycle, the CTB will allow eligible entities to re-submit the project the next cycle.

Other considerations regarding resubmittal of projects include the following:

- A project that has been selected for funding cannot be resubmitted to address cost increases or the loss of other sources of funding.
- Once a project is selected for funding, an entity must wait for two rounds of SMART SCALE following the end date of construction before submitting a new project application for the same location that meets the same need as the project that was selected for funding.
- Once a project is selected for funding, an entity may not resubmit the project with a revised scope in a subsequent round unless the previously selected project has been canceled.

Post Selection SYIP Allocations

A project that has been selected for funding must be initiated, and at least a portion of the programmed funds expended within one year of the budgeted year of allocation (first fiscal year in the SYIP that includes DGP or HPP allocations) or funding may be subject to reprogramming to other projects selected through the prioritization process. In the event the Project is not advanced to the next phase of construction when requested by the CTB, the locality or metropolitan planning organization may be required, pursuant to § 33.2-214 of the Code of Virginia, to reimburse the Department for all state and federal funds expended on the project.

The Board may adjust the timing of funds programmed to projects selected in previous SMART SCALE cycles to meet the cash flow needs of the individual projects, but will not (1) reduce the total amount of state and federal funding committed to an individual project unless it is no longer needed for the delivery of the project or the project sponsor is unable to secure permits and environmental clearances for the project or (2) increase the total amount of state and federal funding committed to an individual project beyond the thresholds requiring CTB action identified in the SMART SCALE policy.

Surplus Funding

In cases where programmed funds are no longer needed for delivery of a project due to estimate decreases, contract award savings, schedule changes, etc., the unexpended surplus funds are reallocated within the SMART SCALE program unless superseded by the terms of a signed project agreement, as follows:

- Surplus DGP funds no longer needed for delivery of a project will remain with the district and may not be used in other districts;
- Surplus HPP funds will be transferred to a statewide balance entry account and may be used on a statewide basis on other High Priority projects; or
- Such funds will be reserved to address budget adjustments on existing SMART SCALE projects or reserved for allocation in the next solicitation cycle for SMART SCALE.

In the event that revenue reductions decrease the amount of actual funding available for a particular SMART SCALE cohort, two approaches are envisioned:

- Delaying timing of projects to out years where future funding may be available; or
- Utilizing SMART SCALE funds from future years to fund the project

5.4 IMPROVEMENTS TO PROCESS AND MEASURES

SMART SCALE represented a new step forward for the Commonwealth of Virginia, and the CTB broke new ground in moving towards a prioritized transportation funding structure. As the process moves into future cycles, SMART SCALE will continue to evolve and improve. Advances in technology, data collection, and reporting tools will upgrade and modernize SMART SCALE for a growing Virginia, and the CTB looks forward to using these tools to provide a more balanced and equitable distribution of the Commonwealth's transportation funds.

5.5 LEGISLATIVE REQUIREMENTS

Periodically the Virginia legislature addresses improvements to SMART SCALE policy through enacting new laws.

In 2020, H.B. 561 was passed to amend and reenact § 33.2-214.2 of the Code of Virginia, relating to project evaluation on primary evacuation routes. As a result, the scorecards will indicate whether such projects are located on a primary evacuation route. The notation does not have an impact on the SMART SCALE score.

In 2021, H.B. 2071 was passed to amend and reenact § 33.2-214.2 of the Code of Virginia, relating to whether a project has been designed to be resilient when evaluating projects for the Six-Year Improvement Program and consider resiliency when establishing the Statewide Transportation Plan. As a result, the scorecards will indicate whether a project is addressing a VTrans Mid-Term need associated with three hazards: (1) sea-level rise, (2) storm surge, and (3) inland/riverine flooding. Additionally, it will be reported on the scorecard if a project has been designed to be or the project sponsor has committed that the design will be resilient. The notation does not have an impact on the SMART SCALE score.

6.0 Appendix A: Safety Measures

Table 6.1 Safety Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
S.1	EPDO of Fatal and Injury Crashes	70%[a]	Equivalent property damage only (EPDO) of fatal and injury crashes expected to be reduced due to project implementation	Estimate the number of fatalities and injury crashes (weighted by "equivalent property damage only" crash value reported by FHWA) at the project location and the expected effectiveness of project-specific counter-measures in reducing crash occurrence
S.2	EPDO Rate of Fatal and Injury Crashes	30%	Equivalent property damage only (EPDO) of fatal and injury crashes per 100 million vehicle miles traveled (VMT) expected to be reduced due to project implementation	Similar to S.1, but by focusing on the change in fatality and injury crashes (weighted by "equivalent property damage only" crash value reported by FHWA) per 100 million vehicle miles traveled (VMT), the measure considers projects that address areas with a high rate of crashes that may be outside of high-volume roadways

[a] 100% for Transit and Transportation Demand Management projects

6.1 S.1 EPDO OF FATAL AND INJURY CRASHES

Definition

EPDO-weighted fatal and injury crashes expected to be reduced due to project implementation.

Data Source(s)

- Most recent five years of crashes from VDOT Roadway Network System (RNS) geospatial (GIS) data prepared by the Traffic Operations Division.
- FHWA report on crash cost estimates by the severity of the injuries sustained adjusted to the mid-year of the analysis period as modified by VDOT[2].
- SYIP to determine if and when improvements have been implemented in proximity to the project in the last five years.

[2] Council, F., Zaloshnja, E., Miller, T., and Persaud, B., Crash Cost Estimates by Maximum Police-Reported Injury within Selected Crash Geometries, U.S. Department of Transportation, Federal Highway Administration (FHWA), October 2005, Washington, DC.

- SMART SCALE Crash Modification Factor (CMF) List, which was developed using a subset of CMFs documented in the VDOT State Preferred CMF List[3] or on FHWA's CMF Clearinghouse website[4]. The SMART SCALE CMF List is published on the Apply page.[5]
- For park and ride projects, data from the U.S. Census Bureau's OnTheMap tool will be used to indicate the most common primary direction(s) and average distances of commute(s) for those living within the catchment area of the proposed improvement. Additionally, when available, lot user surveys or other applicable information (conducted within the past five years) of existing park and rides within reasonable proximity of the proposed improvement can supplement OnTheMap data. Common directions of travel and average distances from OnTheMap, as well as any available origin-destination information from lot users surveys, are used to apply logical routing. The number of new park and ride users is determined using existing park and ride utilization in the area and/or projected demand based upon an established methodology that factors in demographic data and travel patterns.[6]

Methodology

Step 1: Compile the latest five years of fatal (F) and injury (I) crashes for the roadway segments within the project limits. The project limits are defined by the following criteria:

- Begin and end milepost for roadway, pedestrian, bicycle, in-roadway transit service (e.g., bus rapid transit), in-roadway freight service corridor improvements.
- The longer of 250 feet from stop bar or the ends of taper for the longest turn lane on each approach for intersection improvements.
- Gore to end of the existing taper for improvements to interchanges that influence merging or diverging operations.
- 500 feet upstream of on-ramp gore to 500 feet downstream of off-ramp gore for improvements to interchanges that influence weaving operations.
- The begin and end milepost on key parallel roadway(s) for projects that are projected to change travel patterns. For transit projects, roadways projected to have decreases in vehicle travel due to increased transit usage will be identified by the Department of Rail and Public Transportation (DRPT). For park and ride projects, roadways projected to have decreases in vehicle travel

[3] *https://www.virginiadot.org/business/resources/vhsip/VA-State-Preferred-CMF-List_acc050222.pdf*

[4] *http://www.cmfclearinghouse.org*

[5] *https://www.smartscale.org/apply/*

[6] *http:onthemap.ces.census.gov/*

due to increased carpooling will be identified by the congestion scoring team. For projects that propose a new roadway or new interchange, the roadways projected to have changes in vehicle travel due to alternative route choices will be identified using a travel demand model updated by Transportation and Mobility Planning Division (TMPD).

Review the SYIP or coordinate with local VDOT staff to determine if and when other improvements have been implemented within the project limits during the five-year analysis period. When other improvements were implemented within the analysis period, collect crash data only for the post improvement years as necessary.

Step 2: Weight the number of crashes by severity using an equivalent property damage only (EPDO) crash value scale .VDOT has developed an average weighted EPDO value for crashes that involve either a fatality or a severe injury. The EPDO values used in the SMART SCALE process are shown in **Table** 6.2. Property damage only crashes are not considered in SMART SCALE scoring but are shown in **Table 6.2** to provide context for the weights given to fatal and injury crashes.

Table 6.2 EPDO Crash Value Conversion

Accident Type	Rounded Value	Weight
Fatal (K) + Severe Injury (A)	$2,715,000	170
Moderate Injury (B)	$300,000	20
Minor Injury (C)	$170,000	10
Property Damage Only (O)	$16,000	0

Step 3: Calculate the percent expected crash reduction (PECR) for projects using the following approaches based on project type:

- For roadway, bicycle, and pedestrian projects, select up to three appropriate CMFs from the SMART SCALE CMF list for each of the project segments. If multiple CMFs are selected for a given segment, multiply the CMF values to create a resultant CMF for the project segment. Calculate the PECR based on the resultant CMF (PECR = 1-CMF) . If any of the selected CMFs are only applicable to specific crash types, calculate separate PECR values for the targeted and non-targeted crash types.
- For projects that are projected to change travel patterns (e.g., projects that propose a new roadway, new interchange, or transit, freight, or park and ride improvements), calculate a CMF based on the ratio of volume projected on roadways after the proposed improvement to the current roadway volume. Calculate the PECR based on the volume-based CMF.

Step 4: Multiply the average annual EPDO crash frequency by the PECR to estimate the number of EPDO crashes expected to be reduced. For freight rail projects, apply the PECR to truck-related fatal and injury crashes only.

Step 5: For projects that propose a new roadway, intersection, or interchange, calculate the number of crashes projected to be added to the network using safety performance functions (SPFs) produced by TOD and volume projections from the travel demand model produced by TMPD. Use crash severity proportion data based on intersection or roadway type from TOD to convert the projected crash total to an EPDO value.

Step 6: Sum the reduction in EPDO crash frequency from Step 4 and the addition in EPDO crash frequency from Step 5 to develop the final projected change in EPDO crash frequency.

Scoring Value

Total change in EPDO of fatal and injury (F+I) crash frequency.

6.2 S.2 EPDO Rate of Fatal and Injury Crashes

Definition

Number of EPDO weighted fatal and injury crashes per 100 million vehicle miles traveled (VMT) expected to be reduced due to the project.

Data Source(s)

- Total change in EPDO of fatal and injury (F+I) crash frequency (S.1).
- Most recent five years of AADT by roadway segment from VDOT RNS, available studies, the applicant/jurisdiction, or congestion measure analysis.
- Segment length from S.1 analysis.

Methodology

The S.2 score is not calculated for projects where the principal improvement type is transit or transportation demand management. For all other projects, use the following steps to calculate S.2.

Step 1: Collect the most recent five years of AADT data for each project segment where a crash reduction was projected due to a roadway, pedestrian, or bicyclist improvement or due to shifting travel patterns on a parallel facility for a new roadway or interchange project. Multiply the AADT data by the segment length to calculate the annual VMT. Sum the annual VMT across all project segments. Do not calculate VMT for any project segments where the only projected crash reduction was due to shifting travel patterns from a transit, freight, or park and ride improvement.

Step 2: Compute the existing Fatal + Injury EPDO crash rate by dividing the S.1 score by the total project VMT.

Scoring Value

Expected reduction in fatal and injury (Fatal + Injury) EPDO crash rate.

7.0 Appendix B: Congestion Mitigation Measures

Table 7.1 Congestion Mitigation Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
C.1	Person Throughput	50%	Increase in corridor total (multimodal) person throughput attributed to the project	Assess the potential benefit of the project in increasing the number of users served within the peak period.
C.2	Person Hours of Delay	50%	Decrease in the number of person-hours of delay in the corridor	Assess the potential benefit of the project in reducing peak period person-hours of delay.

7.1 C.1 Person Throughput

Definition

Change in corridor total (multimodal) person throughput attributed to the project.

Data Source(s)/Analytical Tools

- Latest available 24-hour traffic count data summarized by hour, direction, and roadway segment, including vehicle classification, where applicable, from VDOT TMS, or jurisdiction.
- Latest available regional travel demand model encompassing the influence area only for projects consisting of new transportation facilities. The project is tested with the regional travel demand model using the SYIP highway network.
- Existing AADT by roadway segment from VDOT TMS or jurisdiction.
- Lane capacity is set by the current functional classification of the roadway. In the case of a new location roadway, the planned functional classification is used. Lane capacities were established based on an average of the capacities vs by area type outlined in the *ENTRADA User's Guide*, August 2020 and the *Virginia Travel Demand Modeling Policies and Procedures Manual Version 3.0*.
- Obtain lane capacities for different facility types (i.e., freeway, collector, etc.) and area types from the *ENTRADA User's Guide*, August 2020. The urban threshold for capacity will be used statewide and is generally based on LOS D/E.
- For park and ride projects, data from the U.S. Census Bureau's OnTheMap tool and Streetlight will be used to indicate the most common primary direction(s) and average distances of commute(s) for those living within the catchment

area of the proposed improvement. Additionally, when available, lot user surveys or other applicable information (conducted within the past five years) of existing park and rides within reasonable proximity of the proposed improvement can supplement OnTheMap and Streetlight data. Common directions of travel and average distances from OnTheMap, as well as any available origin-destination information from lot users surveys, are used to apply logical routing. The number of new park and ride users is determined using existing park and ride utilization in the area and/or projected demand based upon established methodology that factors in demographic data and travel patterns.

- For transit projects, the Department of Rail and Public Transportation (DRPT) will provide estimated daily ridership and hourly ridership for the proposed service.
- For new managed lane projects, assumed occupancy rates will be provided by VDOT.
- For roadway projects, SPS will be used to determine the number of lanes, lane widths, speed limit, terrain (e.g., level, rolling, mountainous), lateral clearance, number of driveways on arterials, interchange density on freeways, and median type on arterials.
- Latest available aerial imagery to determine merge, diverge, and weaving lengths on freeways and verify other data from SPS.
- FHWA Cap-X: evaluation tool that uses critical lane volumes (CLV) to evaluate the efficiency of intersections and interchanges.
- Potential traffic growth rate sources include SPS, and the travel demand model.

Methodology

The methodology is a quantitative, corridor-based analysis that requires a no-build (without the project) and build (with the project) estimate of person throughput seven years in the future. It is anticipated that the project corridor will consist of an intersection or segment within the corridor, depending on the project type. The segment within the corridor with calculated person throughput increase above zero is used for analysis purposes.

The methodologies to determine person throughput for roadway, bicycle/pedestrian, transit, TDM (including park and ride lots), and freight projects are described below.

For all project types described in this section, person throughput is only credited/ scored if the facility is over capacity in the no-build project condition (has a volume to capacity ratio greater than 1.0)

Roadway

There are four types of analyses used to quantify the change in person throughput as a result of a proposed roadway project:

- Basic roadway segment (freeway, rural multilane, rural two-lane), urban arterial (segments between signals are combined with delay calculations from Cap-X to establish no-build versus build average travel speeds)
- Freeway facility (diverge, merge, weave)
- Intersection or interchange, and
- New/Complex facilities - Limited-access roadway capacity expansion projects greater than two miles in length are defined as complex.

The methodology to compute the change in person throughput will be described for each of the four facility types listed above. The methodology for the analysis of the first two facility types is the same.

Basic Roadway Segment / Freeway Facility

Basic segments represent uninterrupted-flow conditions and have no fixed causes of delay or interruption external to the traffic stream. This category includes two-lane highways, multilane highways, and basic freeway segments as defined in the *Highway Capacity Manual 6*. Freeway facilities also represent uninterrupted-flow facilities consisting of continuously connected segments that include: basic freeway, weaving, merge, and diverge segments. In order to calculate average travel speeds along signalized arterial routes, basic roadway segments are coded along the project length and are combined with the Cap-X analysis to compute the no-build and build average travel speeds.

A modified BPR equation is used for the analysis of these types of facilities. Nationally, the BPR equation is the mostly widely used volume-delay function for road segments. The equation addresses the relationship between volume and capacity on the segment, with the result being the delay associated with traffic volumes. Capacity in the BPR equation is based on the area type and facility type.

Step 1: Compile future no-build peak period traffic volumes within the project corridor using traffic data provided in the project application. If no traffic data is provided, compile existing peak period traffic volumes using the aforementioned data sources, including existing peak period traffic count data from VDOT TMS.

Step 2: Determine the peak period flow rate on the roadway segment without the project and with the project. Using the capacity values by functional classification, compute the vehicle throughput without the project and with the project.

Step 3: Compute the change in peak period vehicle throughput by subtracting the no-build vehicle throughput from the build vehicle throughput.

Step 4: Compute the peak period person throughput for no-build and build conditions by multiplying the average vehicle occupancy rate by the vehicle throughput.

Intersection / Interchange

Intersections and interchanges represent interrupted flow conditions with features that create delay such as traffic signals.

Step 1: Compile future no-build peak period traffic volumes within the project corridor using traffic data provided in the project application. If no traffic data is provided, compile existing peak period traffic volumes using the aforementioned data sources, including existing peak period traffic count data from VDOT TMS.

Step 2: Use FHWA CAP-X analysis tool to determine the intersection/ interchange critical lane volumes and to estimate the vehicle throughput for the no-build and build conditions.

Step 3: Compute the change in peak period vehicle throughput by subtracting the no-build vehicle throughput from the build project vehicle throughput.

Step 4: Compute the peak period person throughput for without and with conditions by multiplying an average vehicle occupancy rate by the vehicle throughput.

New/Complex Roadway Facilities

Estimating vehicle throughput for new roadway facilities requires the use of a regional travel demand model. The project is added to the regional travel demand model, using the SYIP highway network, and model outputs are then used to summarize with project vehicle throughput.

Step 1: Code the new facility into the regional travel demand model with assumed posted speed limit, facility type, and number of lanes.

Step 2: Identify links in the regional network operating below the speed limit in future no-build scenario with greater than 10% reduction of traffic for the different alternative improvements compared to the no build scenario. The congestion limits should include network segments that are expected to be impacted, such as any roadways that vehicles may shift to or from in response to the new facility. A buffer equal to the project length with a floor of one mile is used to capture the impacted segments for the analysis. The minimum buffer of one mile is used to capture parallel routes for smaller projects. Calculate total difference in VHT for these links between the no-build model and the build model.

Step 3: Multiply the difference between the no-build VHT from the build VHT by 30% to convert to peak period delay reduction (expressed in vehicle hours).

Step 4: Compute the peak period vehicle throughput by multiplying the peak period delay reduction by 60 to convert to vehicles minutes traveled, and dividing this difference by the average trip length (expressed in minutes).

Step 5: Compute the peak period person throughput by multiplying an average vehicle occupancy rate by the vehicle throughput.

Transit / Bicycle/Pedestrian / Freight Rail / TDM

New service for alternative modes supports change in throughput both on the other mode and on highway network. For trips on other modes, estimate total person throughput for future no-improvement and future new users in the peak period. The person throughput reduction for new users is associated with any throughput savings associated with a shift from auto to the other mode. For the highway network, total demand is reduced, which may lead to a reduction in vehicle demand on parallel facilities. For transit projects, compute the number of equivalent vehicles on roadway(s) within the impacted area using a forecasted ridership per hour and an assumed transit occupancy. Once the number of vehicles on impacted roadway(s) is computed, determine the peak period person throughput for no-build and build conditions by multiplying an average vehicle occupancy rate by the vehicle throughput.

Scoring Value

Total change in person throughput due to the project.

7.2 C.2 PERSON HOURS OF DELAY

Definition

Decrease in the number of peak period person hours of delay in the project corridor.

Data Sources/Analytical Tools

- Latest available 24-hour traffic count data summarized by hour, direction, and roadway segment, including vehicle classification, where applicable, from VDOT TMS, or jurisdiction.
- Latest available regional travel demand model encompassing the influence area only for projects consisting of new location transportation facilities.
- Existing AADT by roadway segment from VDOT TMS or jurisdiction.
- Lane capacity is set by the current functional classification of the roadway. In the case of a new location roadway, the planned functional classification is used. Lane capacities were established based on an average of the capacities outlined in the *ENTRADA User's Guide*, August 2020 and the Virginia Travel Demand Modeling Policies and Procedures Manual Version 3.0.
- For park and ride projects, data from the U.S. Census Bureau's OnTheMap tool and Streetlight will be used to indicate the most common primary direction(s) and average distances of commute(s) for those living within the catchment

area of the proposed improvement. Additionally, when available, lot user surveys or other applicable information (conducted within the past five years) of existing park and rides within reasonable proximity of the proposed improvement can supplement OnTheMap data. Common directions of travel and average distances from OnTheMap, as well as any available origin-destination information from lot user's surveys, are used to apply logical routing. The number of new park and ride users is determined using existing park and ride utilization in the area and/or projected demand based upon established methodology that factors in demographic data and travel patterns.

- For transit projects, Department of Rail and Public Transportation (DRPT) will provide estimated daily ridership and hourly ridership for the proposed service.
- For new managed lane projects, assumed occupancy rates will be provided by VDOT.
- For roadway projects, SPS will be used to determine number of lanes, lane widths, speed limit, terrain (e.g., level, rolling, mountainous), lateral clearance, number of driveways on arterials, interchange density on freeways, and median type on arterials.
- Latest available aerial imagery used to determine merge, diverge, and weaving lengths on freeways and verify other data from SPS.
- FHWA Cap-X: evaluation tool that uses critical lane volumes (CLV) to evaluate the efficiency of intersections and interchanges.
- Potential traffic growth rate sources include SPS, and travel demand model.

Methodology

The methodology is a quantitative, corridor-based analysis that requires a no-build (without project) and build (with the project) estimate of person throughput and congested travel speeds seven years in the future.

The methodologies to determine person-hours of delay for roadway, bicycle/pedestrian, transit, and freight projects are described below. It is anticipated that project corridor length definition will vary by mode and project type. For example, the project length for a park and ride lot project is equal to the average commuting distance determined from the census data website identified in the data sources. On the other hand, the project length for a roadway corridor improvement project is established by extending the corridor to the next adjacent signalized intersection or interchange on both ends of the corridor. If there are no adjacent signalized intersections or interchanges within one mile of either end of the corridor, then one mile is added to both ends of the corridor.

Roadway

There are four types of analyses used to quantify the change in person-hours of delay as a result of a proposed roadway project:

- Basic roadway segment (freeway, rural multilane, rural two-lane, urban arterial)
- Freeway facility (diverge, merge, weave),
- Intersection or interchange, and
- New facility.

Basic Roadway Segment/ Freeway Facility

Basic segments represent uninterrupted-flow conditions and have no fixed causes of delay or interruption external to the traffic stream. This category includes two-lane highways, multilane highways, and basic freeway segments as defined in the *Highway Capacity Manual 6*. Freeway facilities also represent uninterrupted-flow facilities consisting of continuously connected segments that include: basic freeway, weaving, merge, and diverge segments. In order to calculate average travel speeds along signalized arterial routes, basic roadway segment sheets are coded along the project length and are combined with the Cap-X analysis to compute the no-build and build average travel speeds.

A modified BPR equation is used for the analysis of these types of facilities. Nationally, the BPR equation is the mostly widely used volume-delay function for road segments. The equation addresses the relationship between volume and capacity on the segment, with the result being the delay associated with traffic volumes. Capacity in the BPR equation is based on functional classification.

Step 1: Compile future no-build peak period traffic volumes within the project corridor using traffic data provided in the project application. If no traffic data is provided, compile existing peak period traffic volumes using the aforementioned data sources, including existing peak period traffic count data from VDOT TMS.

Step 2: Collect and document all roadway geometric features using data from SPS and supplemented by field visits and/or aerial imagery.

Step 3: Convert the peak period traffic volumes to flow rates using methods from the *Highway Capacity Manual 6*.

Step 4: Compute no-build and build travel speeds and delays using a modified BPR equation. Delay is calculated by calculating the difference between the predicted travel speed and the posted speed limit.

Step 5: Compute the change in vehicle hours of delay by subtracting the build (with project) delay from the non-build (without project) delay.

Step 6: Compute the peak period person hours of delay for no-build and build conditions by multiplying an average vehicle occupancy rate by the vehicle delay.

Step 7: Compute the change in person hours of delay by subtracting the build (with project) delay from the non-build (without project) delay.

Intersection / Interchange

Intersections and interchanges represent interrupted flow conditions with features that create delay such as traffic signals. Corridor travel speed and delay will be calculated based on intersection/interchange delay and segment speed and delay. Apply a capacity check for intersection/interchange and roadway segment. Use the least improved bottleneck to calculate throughput change between the no-build (without project) and the build (with project) conditions.

Step 1: Compute future no-build peak period traffic volumes within the project corridor using traffic data provided in the project application. If no traffic data is provided, compile existing peak period traffic volumes using the aforementioned data sources, including existing peak period traffic count data from VDOT TMS.

Step 2: Determine the critical lane volume for each approach to the intersection, which is defined as the movements with the maximum traffic volume per lane.

Step 3: Use FHWA CAP-X analysis tool to estimate the vehicle delay for the no-build and build conditions.

Step 4: Compute the peak period person delay for no-build and build conditions by multiplying the average vehicle delay by an average vehicle occupancy rate by the vehicle delay.

Step 5: Compute the change in peak period delay by subtracting the build (with project) delay from the non-build (without project) delay.

New Roadway Facilities

Estimating vehicle delay for new facilities requires the use of a regional travel demand model. The project is added to the regional travel demand model and model outputs are then used to summarize project build vehicle delay. The total vehicle delay reduction is the cumulative effect at a system level (total trips).

Step 1: Code the new facility into the regional travel demand model with assumed posted speed limit, facility type, and number of lanes.

Step 2: Identify links in the regional network operating below the speed limit in future no-build scenario with greater than 10% reduction of traffic for the different alternative improvements compared to the no build scenario. The congestion limits should include network segments that are expected to be impacted, such as any roadways that vehicles may shift to or from in response to the new facility. A buffer equal to the project length with a floor of one mile is used to capture the impacted segments for the analysis. The minimum buffer of one mile is used to capture parallel routes for smaller projects. Calculate total difference in VHT for these links between the no-build model and the build model.

Step 3: Multiplying the difference between the no-build VHT from the build VHT by 30% to convert to peak period delay reduction (expressed in vehicle hours)

Step 4: Compute the person peak period delay by multiplying the peak period delay reduction by an average vehicle occupancy rate and 60 to convert to personal trip minutes.

Transit / Freight Rail / TDM

New service from alternative modes supports change in delay both on the other mode and on the highway network. For trips from other modes, estimate total person travel time savings for existing and new users in the peak hour. The person travel time savings for future no-improvement users is associated with any improvement in frequency or travel time associated with the project. The person travel time savings for new users is associated with any travel time savings associated with a shift from auto to the other mode. For the highway network, total demand is reduced, which may lead to a reduction in delay on parallel facilities.

Bicycle/Pedestrian

No reduction in person-hours of delay is assumed for a stand-alone bicycle and/or pedestrian project.

Scoring Value

Total peak-period person delay reduction.

8.0 Appendix C: Accessibility Measures

Table 8.1 Accessibility Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
A.1	Access to Jobs	60%	Change in average job accessibility per person within 45 minutes by driving (within 60 minutes for transit, bicycle, and pedestrian projects)	Measure assesses the average change in access to employment opportunities in the region as a result of project implementation based on the GIS accessibility tool.
A.2	Access to Jobs for Disadvantaged Populations	20%	Change in average jobs accessibility per person for disadvantaged populations within 45 minutes by driving (within 60 minutes for transit, bicycle, and pedestrian projects)	Measure assesses the average change in access to employment opportunities in the region as a result of project implementation based on the GIS accessibility tool.
A.3	Access to Multimodal Choices	20%	Assessment of the project support for connections between modes and promotion of multiple transportation choices	Measure assigns more points for projects that enhance interconnections among modes, provide accessible and reliable transportation for all users, encourage travel demand management, and potential to support incident management.

8.1 A.1 ACCESS TO JOBS

Definition

The GIS accessibility tool analyzes the existing average accessibility to jobs within 45 minutes per person at the individual U.S. Census block group level statewide. For transit, bicycle, and pedestrian projects, accessibility will be calculated to jobs within 60 minutes. The tool calculates the average accessibility to jobs by mode (auto, walk, bicycle, and transit). The jobs are weighted based on a travel time decay function, where jobs within a shorter travel time are weighted more than jobs farther away. The decay function was developed based on travel survey data. The average accessibility represents the total number of jobs reachable in a 45 minute travel time from each block group to every other block group by driving and in a 60 minute travel time from blocks to blocks by other modes.

The tool calculates the improvement in the number of jobs reachable within that travel shed resulting from a proposed transportation improvement. Therefore, the average number of jobs reachable represents the total jobs accessible from each block group/block to every other block group/block, weighted by the population

in each analytic zone. The actual metric relevant for SMART SCALE prioritization purposes is the increase in average job accessibility resulting from a proposed project. Travel times are based on congested roadway travel times, real transit operating schedules, and an assessment of pedestrian and bicycle network connectivity.

As part of the estimation of change in project corridor person-hours of delay (Measure C.2), an estimate of the project build congested speed is developed. The project build congested speed is entered into the underlying congested network within the accessibility tool, and the difference between the build and no-build congested speeds is used to calculate the change in cumulative accessibility by block group for auto.

Data Source(s)

- Accessibility tool.
- Change in project corridor congested speed, transit operations, and pedestrian system connectivity (as it relates to last-mile connections to transit service).

Methodology

The accessibility tool reports average accessibility to jobs by mode for each Census block group (for auto or Census block for walk, bicycle, and transit) in the region. The analysis of project benefits considers how an improvement in travel time expands accessibility to jobs at the block group or block-level (without consideration of regional or State boundaries). By default, 2040 land use forecasts will be used. Applicants may also provide modified land use density assumptions from a locally or regionally approved market study to be used for Build versus No-Build analysis.

Step 1: Update congested roadway speeds, transit network, or pedestrian system connectivity. Based on the analysis conducted in the congestion factor for measure C.2, post-project implementation congested speeds are generated and applied to the roadway network underlying the accessibility tool. For transit projects, the project corridor and basic operational information (peak period frequency and travel times) are coded into the transit network (based on General Transit Feed Specification (GTFS) data, which is a common format for public transportation schedules and associated geographic information) underlying the accessibility tool. For the non-motorized mode, the tool reflects improvements in connectivity provided by the new sidewalk, bicycle lanes or path connections or meaningful pedestrian elements that substantially improve the quality of service for pedestrians, bike users or on routes providing access to transit service.

Step 2: Use the accessibility tool to calculate the current (no build) accessibility by mode for a project. The accessibility is the average access to jobs from each block group/block to every other block group/block within the project's area of influence.

Step 3: Use the accessibility tool to calculate the build accessibility (using post-project implementation congested speeds and/or changes in quality of service of walking/bicycle network and transit operations) by mode for a project.

Step 4: Calculate the change in accessibility scores between the build and no-build conditions. For each project, an average accessibility improvement is reported (depending on mode, e.g., for roadway projects the auto mode improvement is reported, for transit projects the transit mode improvement is reported, for projects that incorporate multiple improvements, they may receive accessibility benefits from auto mode and other modes).

Scoring Value

Total change in average jobs accessibility.

8.2 A.2 ACCESS TO JOBS FOR DISADVANTAGED POPULATIONS

Definition

The accessibility tool analyzes the existing average accessibility to jobs within 45 minutes at the individual U.S. Census block group level statewide. For walk, bicycle and transit projects, accessibility will be calculated to jobs within 60 minutes. The tool calculates the average accessibility to jobs by mode (auto, walk, bicycle, and transit). The jobs are weighted based on a travel time decay function, where jobs within a shorter travel time are weighted more than jobs farther away. The decay function was developed based on travel survey data. The average accessibility represents the total number of jobs reachable in a 45 minute travel time from each block group to every other block group by driving and in a 60 minute travel time from blocks to blocks by other modes[7]. For this measure, the change in average job accessibility is calculated and averaged based on the disadvantaged population in each Census block or block group.

Data Source(s)

- Accessibility tool.
- 2020 U.S. Census American Community Survey 5-year estimates.

[7] The area of influence of a project is defined as a 45 mile radius circle around the project for auto and transit modes (reflecting 45 minutes of travel at 60 miles per hour)) and a 3-mile and 10-mile buffers for walk and bicycle modes respectively. Beyond this area of influence, the tool does not calculate job accessibility as it is a distance that is not relevant to the vast majority of trips.

Methodology

For the purposes of this analysis, the "disadvantaged population" is calculated as low-income, minority, or limited-English proficiency (LEP) population.

All Census blocks and block groups in Virginia were analyzed to determine the populations of low-income, minority, or limited English speaking persons (LEP) in each.

The accessibility tool calculates job accessibility averaged by population in each Census block or block group. The calculation of accessibility for the disadvantaged population was calculated in exactly the same way as described in A.1 above for general accessibility, except that instead of averaging for population as a whole, the accessibility was averaged for the disadvantaged population in each Census block or block group.

Scoring Value

Total change in average jobs accessibility for disadvantaged populations.

8.3 A.3 ACCESS TO MULTIMODAL CHOICES

Definition

This measure considers the degree to which the project can increase access to non-single occupant vehicle travel options. The objective is to recognize projects that enhance connections between modes or create new connections.

Data Source(s)

- GIS data of transit routes or transit service areas, all rail transit stations (from GTFS data as described for accessibility tool).
- DRPT/VDOT GIS data of park and ride lots.
- VDOT GIS data of on and off-road bicycle facilities (incomplete dataset at this time).
- Anticipated peak period non-SOV users of travel options with increased access or service.

Methodology

Step 1: The project sponsor provides project-level detail on the extent of connections and accommodation of multiple modes as part of the project definition and self-assign points consistent with descriptions in **Table 8.2**.

Step 2: The project corridor is entered into a GIS database and overlaid with a layer including all multimodal transportation options. The GIS analysis is recommended to inform the validation of sponsor scoring in **Table 8.2**.

For roadway or multimodal projects, this includes type of bicycle facility, type of pedestrian facilities, connection to park and ride locations or inclusion of managed lanes, inclusion of technology supporting traveler information, or wayfinding signage to other modes, and accommodation of on-road transit vehicles.

For transit projects, depending on transit mode, this includes associated bike and pedestrian facilities, bicycle parking, accommodation of bike on transit vehicles, park and ride facilities, traveler information, affiliation or presence of local TDM programs, and transfers with other transit modes.

For bike and pedestrian projects, this includes class of bicycle facility, type of pedestrian improvements, connections to other on- or off-road bicycle facilities, connections to transit facilities, and affiliation or presence of local TDM programs. A bicycle facility project can include elements in one or more of the following categories:

- On-Street Facilities: Shared use paths, separated bicycle lanes (cycle tracks), buffered bicycle lanes, conventional bicycle lanes, bicycle boulevards (signed routes), and shared roadways.
- Off-Street Facilities: Off-street bicycle facilities are separate from motor-vehicle roadways and include shared-use paths or trails. Trails may be adjacent to the roadway or located on an abandoned railroad right of way.
- Equipment: Bicycle facility equipment includes signs, traffic signals, barriers, and bicycle parking. Note: standalone equipment improvements, including bicycle racks as part of an application are not eligible as a bicycle facility.

Freight-related accessibility is considered in the economic development factor.

Table 8.2 Access to Multimodal Choices – Scoring Approach

Project Type (Mode) and Characteristics	Points (If Yes)
Project includes transit system improvements or reduces delay on a roadway with scheduled peak service of 1 transit vehicle per hour.	5
Project includes improvements to an existing or proposed park and ride lot. Ex. New lot, more spaces, entrance/exit, technology (payment, traveler information).	4
Project includes improvements to existing or new HOV/HOT lanes or ramps to HOV/HOT	2
Project includes construction, enhancement, or replacement of bike facilities. For bicycle projects, off-road or on-road buffered or clearly delineated facilities are required.	1.5
Project includes construction, enhancement, or replacement of pedestrian facilities. For pedestrian projects, sidewalks, pedestrian signals, marked crosswalks, refuge islands, and other treatments are required (as appropriate).	1.5
Project provides real-time traveler information or wayfinding specifically for intermodal connections (access to transit station or park and ride lot).	1
Provides traveler information or is directly linked to an existing TMC network/ITS architecture.	1
Total Points Possible	**5 points maximum**
Measure Scaling: Points are multiplied by the number of new peak period non-SOV users	

Step 3: SMART SCALE review staff evaluate project scoring and work with project sponsor to adjust scoring as necessary.

Step 4: Total project points are then multiplied (scaled) by the number of peak period non-SOV users.

Scoring Value

Total points reflecting multimodal choices scaled by the number of peak period non-SOV users of the project.

9.0 Appendix D: Environmental Quality Measures

Table 9.1 Environmental Quality Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
E.1	Air Quality and Energy Environmental Effect	100%	Potential of project to improve air quality and reduce greenhouse gas emissions	Measure rates a project's potential benefit to air quality by project benefits to non-SOV and freight users, applying a user based point system and a carbon dioxide offset calculation.
E.2	Impact to Natural and Cultural Resources	(*)	Potential of project to minimize impact on natural and cultural resources located within project buffer	Measure evaluates how much sensitive land could be affected within project buffer around the project. Points are subtracted from final score based on total potential sensitive acreage impacted.

* Up to 5 points subtracted from final score based on the total potential sensitive acreage impacted

9.1 E.1 Air Quality and Energy Environmental Effect

Definition

The Air Quality and Energy Environmental Effect measure estimates the level of benefit that a project is projected to have on air quality and greenhouse gas emissions. The objective of this measure is to recognize projects that are expected to contribute to improvements in air quality and reductions in greenhouse gas emissions.

Data Source(s)

- Project sponsor answers defined qualifiers as described below based on project definition.
- Increase in peak hour non-SOV users as determined in the congestion factor.
- Decrease in the number of peak period person-hours of delay as determined in the congestion factor.
- Percent trucks determined using Existing AADT by roadway segment from VDOT TMS or jurisdiction.

- Trip length as determined in the congestion factor.
- Fuel use factor and emissions factor

Methodology

Air quality and energy effect are determined by reviewing a project sponsor response (collected through the project nomination) to the qualifications identified in **Table 9.2**. The methodology applies to all project types.

Step 1: The project sponsor self-assesses the project based on **Table 9.2**. The nomination form includes space for the sponsor to provide clarifications/justifications for the points awarded.

Step 2: SMART SCALE review staff receive each project nomination and review the information provided. As appropriate, staff contact project sponsors to address any questions or unexplained assignments.

Table 9.2 Air Quality and Energy Environmental Effect – Scoring Approach

Project Type (Mode) and Characteristics	Points (If Yes)
Non-SOV Project Characteristics	
Project includes improvements to rail transit or passenger rail facilities.*	3
Project includes construction or replacement of bike facilities. For bicycle projects, off-road or on-road buffered or clearly delineated facilities are required.*	2
Project includes construction or replacement of pedestrian facilities. For pedestrian projects, sidewalks, pedestrian signals, marked crosswalks, refuge islands, and other treatments are required (as appropriate).*	2
Project includes improvements to an existing or proposed park and ride lot. Ex. New lot, more spaces, entrance/exit, technology (payment, traveler information).*	2
Project includes bus facility improvements or reduces delay on a roadway with scheduled peak service of 1 transit vehicle per hour.*	1
Project includes energy-efficient fleets, including hybrid or electric buses*	0.5
Measure Scaling: *Points are multiplied by the increase in the number of peak period non-SOV users for that category	
Freight Transportation Project Characteristics	**Points (If Yes)**
Project reduces traffic delay at a congested intersection, interchange, or other bottleneck with a high percentage of truck traffic (greater than 8 percent of AADT). ** • 0 < Person Hours of Delay Reduced < 2 = 0.5 point • 2 <= Person Hours of Delay Reduced < 100 = 1 point • Person Hours of Delay Reduced >= 100 = 2 points	0.5 - 2
Project includes improvements to freight rail network or intermodal (truck to rail) facilities/ports/terminals.**	0.5
Measure Scaling: **Points are multiplied by peak period truck volumes	

Step 3: Apply User-Based Point System - Weighted 50%

After SMART SCALE staff review and confirm points assigned in **Table 9.2**, the non-SOV project component points are scaled by the respective increased users then all component values are summed. The scaled non-SOV users are normalized (0 to 50 scale). The freight project component points are scaled by the peak period truck volume then all component values are summed. The scaled freight users are normalized (0 to 50 scale).

The final user-based point value is the summation of the normalized (0-50 scale) non-SOV component and the normalized (0-50 scale) freight component.

Step 4: Carbon Dioxide (CO_2) Offset - Weighted 50%

CO_2 Offset Due to Increased Non-SOV VMT

The increased non-SOV vehicle miles traveled (VMT) users are calculated by multiplying the increase in non-SOV users by the trip length. The non-SOV CO_2 offset is calculated by dividing the increase in non-SOV VMT by the average fuel economy and then multiplying by the CO_2 emissions factor. For example,

$$100 \text{ Non-SOV VMT} \times \frac{1 \text{ gal gas}}{24 \text{ miles}} \times \frac{8.9 \text{ kg } CO_2}{1 \text{ gal gas}} = 37.1 \text{ kg } CO_2 \text{ reduced}$$

CO_2 Offset Due to Reduced Heavy Vehicle Hours of Delay (HVHD)

Calculate the reduced HVHD by dividing the total person-hours of delay reduced (C.2 measure) by 1.2 persons/vehicle, and multiply by the weighted average truck percent. For example,

$$100 \text{ person hours} \times \frac{1 \text{ vehicle}}{1.2 \text{ persons}} \times 12\% \text{ heavy vehicles} = 10 \text{ HVHD reduced}$$

The total freight CO_2 offset is calculated by multiplying the reduced HVHD by the diesel fuel idling and CO_2 emissions factors. For example,

$$10 \text{ HVHD reduced} \times \frac{0.44 \text{ gal gas}}{1 \text{ hour}} \times \frac{8.9 \text{ kg } CO_2}{1 \text{ gal gas}} = 39.2 \text{ kg } CO_2 \text{ reduced}$$

Total CO_2 Offset

The total CO_2 offset is calculated by adding the CO_2 offset due to increased non-SOV VMT and CO_2 offset due to reduced heavy vehicle hours of delay. For example,

$$37.1 \text{ kg } CO_2 \text{ reduced} + 39.2 \text{ kg } CO_2 \text{ reduced} = 76.3 \text{ kg } CO_2 \text{ reduced}$$

After completing all Step 4 calculations, normalize the values on a 0 to 100 scale.

Step 5: Sum the User-Based Point Value results from Steps 1-3 weighted at 50% and the Carbon Dioxide (CO_2) Offset results from Step 4 weighted at 50%.

Scoring Value

Combines air quality qualified by a user-based points system and air quality quantified by CO_2 offset of the project.

9.2 E.2 IMPACT TO NATURAL AND CULTURAL RESOURCES

Definition

This measure considers the potential of a project to minimize the impact on natural and cultural resources located within the project impact buffer.

Data Source(s)

GIS layers for each of four categories. For cultural resources, associated non-spatial data ("NRE Eligibility Status") will be used to determine eligibility for listing in the National Register of Historic Places. For threatened and endangered species, species status will be referenced to filter the spatial data appropriately and is limited to state endangered, state threatened, federal endangered, federal threatened.

Methodology

The potential of the project to minimize the impact on natural and cultural resources is conducted by considering the existing acres of sensitive areas and resources located within a project impact buffer, as shown in **Table 9.3** below, as well as the type of environmental document (EIS, EA, CE, PCE) expected to be required for the project. The final E.2 (Natural and Cultural Resource Impact) score for the project will be based on the total acres affected within the project buffer (initial score) and the weighted points derived from other factor areas. The resulting value is then renormalized to calculate the final score and weighting is applied. Measure E.2 is unique among evaluation measures because the score is subtractive.

Step 1: Using the project impact buffer around each project, total the acreage of land in four categories – 1) Conservation Land, 2) Species/Habitat, 3) Cultural Resources, and 4) Wetlands. The specific GIS layers used in each category are as follows:

Conservation Lands

- Appalachian Trail Conference Appalachian Trail
- Virginia Outdoor Foundation Protected Easements
- Virginia Department of Conservation and Recreation Conservation Land
- Virginia Department of Conservation and Recreation 6F properties

- Virginia Department of Conservation and Recreation Natural Heritage Screening Sites
- Virginia Department of Forestry Agricultural/Forest Districts

Species/Habitat

- Virginia Department of Wildlife Resources Threatened and Endangered Species
- Virginia Department of Wildlife Resources – Bats and Roost Trees

Cultural Resources

- National Park Service, American Battlefield Protection Program Potential National Register (POTNR) Areas
- Virginia Department of Historic Resources Architecture layer: properties listed in or determined eligible for listing in the National Register of Historic Places ("NRE Eligibility Status")
- Virginia Department of Historic Resources Archeology layer: sites listed in or determined eligible for listing in the National Register of Historic Places ("NRE Eligibility Status")
- Virginia Department of Conservation and Recreation Conservation Lands (Managing Agency= Virginia Department of Historic Resources)

Wetlands

- U.S. Fish and Wildlife Service National Wetlands Inventory

Step 2: Determine the level of environmental documentation required for the federal action. This information will be used to assess and scale the potential natural resource impacts. If not already determined by the appropriate federal agency with the action, VDOT/DRPT environmental staff will determine the anticipated level of environmental documentation required for the project using the best available information. Concurrence by the federal agency is required prior to the initiation of environmental documentation. The amount of potentially impacted acreage that will be counted towards the score is different based on the type of environmental document required:

- *Environmental Impact Statement (EIS)* – 50% of acreage used for scoring
- *Environmental Assessment (EA)* –30% of acreage used for scoring
- *Categorical Exclusion (CE)* – 10% of acreage used for scoring
- *Programmatic Categorical Exclusion (PCE)* – 0% of acreage used for scoring

This process of scaling acres based on the type of environmental document is illustrated in **Table 9.4** below.

If the sum of potentially impacted acres across all categories exceeds the total number of impact buffer acres (i.e., there are areas with multiple overlapping

categories), the final measure is capped at the total size of the impact buffer in acres.

Table 9.3 Impact Buffer Area by Transportation Project Tier

Impact Buffer by Feature Type Selected	Impact Buffer
Tier 1 Access Management, Bike/Pedestrian Other, Construct or Convert Existing General Purpose or Parking Lane to Bus-only Lane, Construct or Improve At-Grade Bike/Pedestrian Crossing, Construct or Improve Bicycle Facility, Construct or Improve Bus Stop / Shelter, Construct or Improve Grade-Separated Bike/Pedestrian Crossing, Construct or Improve Turn Lane(s), Construct Shared-Use Path, Construct Sidewalk, Improve Grade-Separated Interchange, Improve Rail Crossing, Increase Existing High-Capacity or Fixed-Guideway Route/Service, Innovative Intersection(s), Intercity Passenger Rail Service Improvements, Intersection Improvement(s), ITS Improvement(s) / Advanced Signal Control, New High-Capacity or Fixed-Guideway Route/Service, New Intersection, New Traffic Signal, New/Expanded Vanpool or On-Demand Transit Service, Other Transit Technology Improvements, Rail Service Improvements, Ramp Improvement(s), Roadway Reconfiguration, Roadway Reconstruction/Realignment, Shoulder Improvement(s), TDM Other, Traffic Signal Modification, Widen Existing Lane(s) (No New Lanes)	30-foot buffer
Tier 2 Construct/Expand Bus Facility, Freight Rail improvements, Improve Park and Ride Lot, New Intercity Passenger Rail Station or Station Improvements, New Park and Ride Lot, New Station or Station Improvements, Right-of-Way/Easements acquisition required	1/8th mile buffer
Tier 3 Add New Through Lanes(s), Improve or Replace Existing Bridge(s), Managed Lane(s) (HOV/HOT/Shoulder), New Bridge, New Interchange-Limited Access Facility, New Interchange-Non-Limited Access Facility, Roadway on New Alignment, Highway Other*, Rail Transit Other*	1/4th mile buffer

***Requires manual review to determine tier placement**

Table 9.4 Example - Impacted Acres by Type of Environmental Document

Project	Conservation	Species/ Habitat	Cultural Resources	Wetlands	Total Acres	Environmental Document Scale	Total Acres Scaled by Environmental Document	Impact Buffer Acres	Final Total Acres
A	100	25	25	150	300	EA (30%)	90	500	90
B	100	25	25	150	300	EIS (50%)	150	500	150
C	20	0	0	5	25	CE (10%)	2.5	500	2.5
D	200	400	200	400	1200	EIS (50%)	600	500	500

Scoring Value

Impacted acres scaled by document type and transportation project tier.

Whereas all the other measures are added together based upon typology weighting, the E.2 measure is applied to that sum as a subtractive measure.

Across typologies, all factor weights sum to 100% for a theoretical maximum benefit score of 100. For a project with no impacts on natural and cultural resources, zero points are subtracted; thus, a theoretical maximum score of 100 is maintained. Non-zero E.2 measures are normalized by dividing by the highest E.2 measure (i.e. the greatest impact on natural and cultural resources) then scaled by 5 points. These derived points, ranging from 0 to 5, are then subtracted from the sum of all other measures' weighted scores. This measure can cause a project with a non-zero score to earn a total adjusted score of zero. No project will receive a negative total benefit score. This process of converting scaled impacted acres to a negative score is illustrated in **Table 9.5** below.

Table 9.5 Example - Natural and Cultural Resources Impacted Acres on Benefit Score

Sum of All Other Weighted Measures	Impact to Natural and Cultural Resources	Normalized E.2 Measure	E.2 Points (Subtractive)	Total Benefit Score
60.0	Highest	100	-5.0	55.0
25.0	Moderate	40	-2.0	23.0
4.0	High	70	-3.5	0.5
3.0	Low	10	-0.5	2.5

10.0 Appendix E: Economic Development Measures

Table 10.1 Economic Development Factor – Measures Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
ED.1	Project Support for Economic Development	60%	Project connectivity with economic development properties, prioritizing the development principles of job and capital expenditure creation, market demand, strategic prioritization, and time to market.	The intent of this measure is to assess if and to what extent the project is supporting future economic development aligned with key development principles.
ED.2	Intermodal Access and Efficiency	20%	Rate projects based on the extent to which the project is deemed to enhance access to critical intermodal locations, interregional freight movement, and/or freight intensive industries.	The intent of this measure is to assess the: Level to which the project enhances access to distribution centers, intermodal facilities, manufacturing industries, or other freight intensive industries; Level to which the project supports enhanced efficiency on a primary truck freight route (or high volume/high-value truck or rail freight corridor); Level to which the project enhances access or reduces congestion at or adjacent to VA ports/ airports.
ED.3	Travel Time Reliability	20%	Improvement in travel time reliability attributed to the project	The intent of this measure is to determine the project's expected impact on improving reliability which supports efforts to retain businesses and increase economic activity.

10.1 ED.1 Project Support for Economic Development

Definition

Measures a project's potential to directly support economic development through proximity to properties being developed for economic development. Each property has varying levels of predicted economic impact based on its current degree of site-readiness, previous investments from economic development organizations, potential for job creation, capital expenditure (large-scale private-

sector investment seeking to open or expand a business facility), and market demand. The final ED.1 score is the total predicted economic impact of all properties in direct proximity to the project.

Data Sources

- GO Virginia Grants Database (previous 5 years)
- Virginia Business Ready Sites Program grant records
- The Tobacco Region Revitalization Commission (previous 5 years)
- Current statewide economic development sites from Virginia Economic Development Partnership's VirginiaScan database, including their VBRSP Tier
- Number of qualifying project visits received (previous 3 years)
- Historical Projects Model (estimates property job and capital expenditure creation potential by regressing property characteristics on over 4,000 nationwide economic development project announcements since 2015)

Methodology

Eligible sites will be selected from VirginiaScan (VAScan) based on driving distance from the project using **Table 10.2**. Estimated job creation and capital expenditure (CapEx) factors will be generated by inputting site characteristics into the Historical Projects Model and ranking each site relative to all other sites in the ongoing SMART SCALE round. The site funding factor will be applied in full if a site has received funding from GO Virginia, the Tobacco Commission, or the Virginia Business Ready Sites Program (VBRSP). The number of qualifying visits to each eligible site over the preceding three years will be tallied and the site with the most visits will receive the maximum factor allocation. All other sites will receive a factor amount proportional to the visits those sites received relative to the maximum. The site readiness factor will be determined based on the VBRSP Tiering, if any, that a site received. Finally, all factors will be summed together to produce the ED.1 Measure. **Figure 10.1** illustrates the overall process as outlined above.

Figure 10.1 Flow Chart for Project Support for Economic Development Measure Value

Step 1: Determine ED Property Eligibility - Distance from Transportation Project (Refer to Table 10.2)

- Tier 1 Transportation Project Type: Within 0.5 miles
- Tier 2 Transportation Project Type: Within 1 mile
- Tier 3 Transportation Project Type: Within 3 miles

Step 2: Calculate Estimated Economic Impact Points

Estimate property job creation potential (maximum of 40 points)

- Input eligible VirginiaScan properties and coordinates into the Historical Projects Model to determine estimated job creation in number of jobs
- Normalize number of jobs relative to all transportation projects with eligible properties to 40 points

Estimate site capital investment (CapEx) potential (maximum of 25 points)

- Input eligible VirginiaScan properties and coordinates into the Historical Projects Model to determine estimated capital expenditure in millions of USD
- Normalize estimated capital expenditurerelative to all transportation projects with eligible properties to 25 points

(Maximum of 65 points can be applied in Step 2)

Step 3: Calculate Funding Points – Yes/No

Determine whether any eligible property has received funding from major state or regional funding pools (maximum of 15 points)

- Identify whether any eligible property has received funding from GO Virginia, the Tobacco Commission, or Virginia Business Ready Sites Program (VBRSP)

(15 points can be applied if any funding was received from listed sources in Step 3)

Step 4: Calculate Project Visit Points

Calculate number of project visits received (maximum of 10 points)

- Determine number of times the transportation project's eligible properties have been visited by site selectors and/or company representatives in coordination with VEDP in the past three years
- Normalize project visits relative to all transportation projects with eligible properties to 10 points

(Maximum of 10 points can be applied in Step 4)

Step 5: Calculate Site Readiness Points

Determine the eligible site with the highest VBRSP Tier (maximum of 10 points)

- Sites that are VBRSP Tier 4 or 5 receive 10 pts.
- Sites that are VBRSP Tier 3 receive 6 pts
- Sites that are VBRSP Tier 2 receive 4 pts
- Sites that are VBRSP Tier 1 receive 2 pt
- Other sites receive 0 pts

(Maximum of 10 points can be applied in Step 5)

Step 6: Calculate Final Measure Value

- ED.1 Measure Value = Sum of Economic Impact Points, Funding Points, Project Visit Points, Site Readiness Points

Property Eligibility by Transportation Project Type

To determine if a VirginiaScan property is eligible for consideration in the ED.1 measure value, the proposed property must be within a certain travel distance from the transportation project. The project type has an assigned tier value, which defines the travel distance within which a property is eligible. The property eligibility determination is defined in **Table 10.2**.

Table 10.2 Property Eligibility by Transportation Project Tier

Transportation Project Tier by Feature Type Selected	Distance from Transportation Project to be an Eligible VAScan Property
Tier 1 Bike/Pedestrian Other, Construct or Convert Existing General Purpose or Parking Lane to Bus-only Lane, Construct or Improve At-Grade Bike/Pedestrian Crossing, Construct or Improve Bicycle Facility, Construct or Improve Bus Stop / Shelter, Construct or Improve Grade-Separated Bike/Pedestrian Crossing, Construct or Improve Turn Lane(s), Construct Shared-Use Path, Construct Sidewalk, Highway Other, Improve Park and Ride Lot, Improve Rail Crossing, Improve or Replace Existing Bridge(s), Increase Existing High-Capacity or Fixed-Guideway Route/Service, ITS Improvement(s) / Advanced Signal Control, New High-Capacity or Fixed-Guideway Route/Service, New Intersection, New Park and Ride Lot, New Traffic Signal, New/Expanded Vanpool or On-Demand Transit Service, Other Transit Technology Improvements, Rail Transit Other, Ramp Improvement(s), Right-of-Way/Easements acquisition required, Roadway Reconfiguration, Roadway Reconstruction/Realignment, Shoulder Improvement(s), TDM Other, Traffic Signal Modification, Widen Existing Lane(s) (No New Lanes)	Up to 0.5 miles
Tier 2 Access Management, Construct/Expand Bus Facility, Innovative Intersection(s) / Roundabout(s), Intercity Passenger Rail Service Improvements, Intersection Improvement(s), Managed Lane(s) (HOV/HOT/Shoulder), New Interchange-Non-Limited Access Facility, Rail Service Improvements	Up to 1.0 miles
Tier 3 Add New Through Lanes(s), Freight Rail improvements, Improve Grade-Separated Interchange, New Bridge, New Interchange-Limited Access Facility, New Intercity Passenger Rail Station or Station Improvements, New Station or Station Improvements, Roadway on New Alignment	Up to 3.0 miles

Example Calculation

Table 10.3 ED.1 Example Project Details

Project	Property	Est. Jobs	Est. CapEx ($M)	Funding Received	Site Visit Count	VBRSP Tier
Project 1	Property A	100	25	N	0	3
	Property B	200	75	Y	2	4
	Project Total	300	100	Y	2	4
Project 2	Property C	150	50	Y	1	3
	Project Total	150	50	Y	1	3

Step 1: Determine property eligibility based on distance from transportation project

- Based on the transportation project tiers in Table 10.2, the distances from each transportation project to be an eligible VAScan property are established
- Sites A and B are determined to be eligible for Project 1 and Site C is eligible for Project 2

Step 2: Calculate the Economic Impact Points from estimated jobs and capital expenditure (CapEx)

- Based on property size and coordinates, job estimates are calculated for each property using the Historical Project Model
- The estimated number of jobs per eligible property are summed for each transportation project
    - Project 1 (300) = Property A's estimated jobs (100) + Property B's estimated jobs (200)
    - Project 2 (150) = Property C's estimated jobs (150)
- The total estimated jobs for the eligible properties of each transportation project are normalized by dividing them by the value of the transportation project with the most estimated jobs
    - Project 1 has the highest number of estimated jobs (300) and receives a normalized job value of 1 (300/300)
    - Project 2 receives a normalized job value of 0.5 (150/300)
- The normalized job values are multiplied by 40 to determine the number of Economic Impact Points associated with estimated jobs
    - Project 1 receives 40 Economic Impact Points from jobs (40*1)
    - Project 2 receives 20 Economic Impact Points from jobs (40*0.5)
- Based on property size and coordinates, CapEx estimates are calculated for each property using the Historical Project Model
- The estimated amount of CapEx per eligible property is summed for each transportation project
    - Project 1 (100) = Property A's estimated CapEx (25) + Property B's estimated CapEx (75)
    - Project 2 (50) = Property C's estimated CapEx (50)
- The total of estimated CapEx for the eligible properties of each transportation project is normalized by dividing it by the value of the transportation project with the largest amount of CapEx
    - Project 1 has the highest amount of CapEx (100) and receives a normalized CapEx value of 1 (100/100)
    - Project 2 receives a normalized CapEx value of 0.5 (50/100)

- The normalized CapEx values are multiplied by 25 to determine the number of Economic Impact Points associated with CapEx
    - Project 1 receives 25 Economic Impact Points from CapEx (25*1)
    - Project 2 receives 12.5 Economic Impact Points from CapEx (25*0.5)
- The Economic Impact Points are summed to determine the total for each project
    - Project 1 receives 65 total points (40 from estimated jobs + 25 from CapEx)
    - Project 2 receives 32.5 total points (20 from estimated jobs + 12.5 from CapEx)

Step 3: Calculate Funding Points based on whether a project has received eligible development funds

- GO Virginia, the Tobacco Commission, and the Virginia Business Ready Sites Program (VBRSP) funding records are reviewed to determine if properties have received funding from those sources
- Each project is awarded 15 points if any of its eligible properties received funding
    - Project 1 receives 15 points as Property B has received funding
    - Project 2 receives 15 points as Property C has received funding

Step 4: Calculate Project Visit Points

- The number of property visits from site selectors and/or company representatives undergone in coordination with VEDP in the past three years is summed for each project
    - Project 1's eligible properties received a total of 2 visits (2 at Property A and 0 at Property B)
    - Project 2's eligible property received a total of 1 visit at Property C
- The number of visits for each project are normalized by dividing the total by the total of the transportation project with the most visits
    - Project 1 has a normalized value of 1 (2/2)
    - Project 2 has a normalized value of 0.5 (1/2)
- These values are then multiplied by 10 to calculate the Site Visit Points
    - Project 1 receives 10 Site Visit Points (10*1)
    - Project 2 receives 5 Site Visit Points (10*0.5)

Step 5: Calculate Site Readiness Points based on VBRSP Tier

- Each project is awarded points based on the eligible property with the highest VBRSP Tier based on the values in **Table 10.1**

- Project 1 receives 10 points because Property B has a Tier of 4
- Project 2 receives 6 points because Property C has a Tier of 3

Step 6: Calculate the Final Measure Value

- Sum the Economic Impact Points, the Funding Points, the Project Visit Points, and the Site Readiness Points for each transportation project
  - Project 1 receives a Final Measure Value of 100 (65+15+10+10)
  - Project 2 receives a Final Measure Value of 58.5 (32.5+15+5+6)

Scoring Value

Summation of a point-based score combining the Economic Impact Points, Funding Points, Project Visit Points, and Site Readiness Points.

10.2 ED.2 INTERMODAL ACCESS AND EFFICIENCY

Definition

Measure rates each project based on the extent to which the project is deemed to enhance access to critical intermodal locations and/or freight intensive industries and supports increased efficiency for freight movement in congested corridors.

Data Sources

- Project description and supporting information provided by the project sponsor
- Project description, if applicable, in the Virginia Multimodal Freight Study (2014)
- STAA Truck Routes and Restrictions[8]
- SMART SCALE Congestion Scoring outputs

Methodology

Project descriptions will be reviewed and assessed based on the extent to which the project is deemed to enhance access to critical intermodal locations and/or freight intensive industries and supports increased efficiency for freight movement in congested corridors.

Points are assigned through a qualitative assessment of the project description and supplementary information submitted by the project sponsor. Flexibility is provided in the project nomination for sponsors to describe the manner in which the project is expected to enhance access to critical intermodal locations,

[8] http://gis.vdot.virginia.gov/vatruckweb/VaTruckRestrictions.aspx

interregional freight movement, and/or freight intensive industries and supports increased efficiency for freight movement in congested corridors. The project rating is based on the extent to which the project is deemed to enhance access to critical intermodal locations, freight networks, and/or freight intensive industries and supports increased efficiency for freight movement in congested corridors. The Congestion Scoring process will identify roadway improvements that are likely to provide an operational benefit to freight movement.

This comparison supports a determination of the level of economic enhancement on a 0 to 6 scale as summarized in **Table 10.4**.

Table 10.4 Intermodal Access and Efficiency – Scoring Approach

Rating Description	Value
1. Level to which the project enhances access to existing or planned distribution centers, intermodal transfer facilities (excluding ports and airports), manufacturing industries or other freight intensive industries	
Project provides direct access (within 1 mile) to existing or planned locations	2
Project provides indirect access (greater than 1 mile, less than 3 miles) to existing or planned locations	1
No direct or indirect access	0
2. Level which the project supports enhanced efficiency on a primary truck freight route	
Project is on the designated STAA National and Virginia Network or a STAA Virginia Access Route [9]	2
Project directly connects to designated STAA National and Virginia Network or a STAA Virginia Access Routes	1
Project is not on and does not connect to the designated STAA National and Virginia Network	0
3. Level to which the project enhances access or reduces congestion at or adjacent to Virginia ports or airports	
Project provides direct access to (within 1 mile) existing or planned ports or airports (measured from designated entry gates to port or air cargo facilities)	2
Project provides indirect access to (greater than 1 mile, less than 3 miles) existing or planned ports or airports (measured from designated entry gates to port or air cargo facilities)	1
No direct or indirect access	0
Total (sum of score)	**0 – 6**

Scoring Value

Total points received based on the assessment in **Table 10.4** are multiplied (scaled) by total freight volume within the project corridor and by the total length of the proposed roadway project contributing to the operational benefit to freight movement. Depending on the project type, the definition of total freight volume within the project corridor will vary. For example, for an interchange project or extension of acceleration/deceleration lanes at an interchange, estimates of freight

[9] http://gis.vdot.virginia.gov/vatruckweb/VaTruckRestrictions.aspx.

volume on the ramps (instead of the mainline) will be used to scale the points received as described in **Table 10.4**.

10.3 ED.3 TRAVEL TIME RELIABILITY

Definition

Change in travel time reliability attributed to the project.

Data Source(s)

- Latest five complete years of crashes from VDOT Roadway Network System (RNS) GIS data maintained by Traffic Operations Division.
- Buffer index (BI) from University of Maryland Regional Integrated Transportation Information System (RITIS).
- Weather information from VDOT VA Traffic database.
- AASHTO *Highway Safety Manual* (HSM), 2010.

Methodology

The methodology to compute travel time reliability for a project is a quantitative, corridor-based analysis with two components: impact and frequency. The impact is defined as the ability of a project to reduce the impact of the four contributors for unreliable travel time:

- Highway incidents
- Weather events
- Work zones
- Capacity bottlenecks

Since other SMART SCALE measures account for the impacts of work zones and capacity bottlenecks, only the impacts of highway incidents and weather events will be accounted for in the computation of travel time reliability.

Frequency is defined as the likelihood of unanticipated delays due to highway incidents and weather events. Estimates of frequency are based on segment data for incidents and weather.

For each project, VDOT will compile information to compute five factors to be used in evaluating the reliability of the proposed project:

- BI
- Incident impact
- Incident frequency
- Weather impact
- Weather frequency

The BI is defined as the extra time travelers should add to average travel times to ensure on-time arrival. This index is expressed as a percentage of the average time. A BI of 0.20 means that traveler needs to increase their time cushion by an extra 20% from the average travel time. This index value is computed by dividing the difference between the 95th percentile travel time and mean travel time by the mean travel time for a segment. For long corridors, the index is averaged using a weighted factor based on VMT.

The BI, which comes from the RITIS data, does not provide statewide coverage. In the first round of SMART SCALE scoring, in cases where data does not exist, the method utilized buffer indices from other nearby facilities. This approach leads to questionable results on low-volume roadways. Moving forward, if BI data does not exist within the project corridor, the approach is to assume there is no reliability issue and BI = 0 - therefore, the score will be 0.

The methodology to compute travel time reliability for roadway projects is defined in the following steps:

Step 1: Determine the impact of incidents on the network. The effectiveness of the project to reduce the impact of incidents within the project study area will be based on the type of project. **Table 10.5** present the impact values of both roadway and transit projects. Project types that are most effective at reducing the impacts of incidents will receive the highest scores as identified in the following scoring criteria:

2: Projects directly improving incident frequency and duration (e.g., interchange improvements, truck run-away ramps, queue warning)

1: Projects improving incident management response (e.g., traveler information systems, location signs, reversible lanes)

0: No impact

While most projects provide one benefit in incident reduction per the project type listed in **Table 10.5**, there are complex projects that provide more than one benefit. For those projects, the total score of the impact of incidents is found by adding the maximum value of one benefit (i.e., 1 or 2) to 10% of the value of the remaining benefits. For example, if a project adds a travel lane and a truck runaway ramp, its score is 2 (travel lane) + 10%x 2 (truck runaway ramp) = 2.2

Step 2: Determine the frequency of crashes using historical crash data. VDOT will compile the latest five years of crashes within the project limits. An annual average Equivalent Property Damage Only (EPDO) value is obtained through data from the VDOT Roadway Network System, and the ratio of cost for crashes by severity published by FHWA and AASHTO since the EPDO value is used as a measure to quantify the incident duration and the impact to travel time reliability, the weight for Fatal crashes is adjusted from 540 to 120 to better reflect the incident duration as opposed to the societal cost as applied in the EPDO calculation for the safety measures. EPDO will be used as a surrogate measure to determine the frequency and duration of incidents since more severe crashes will typically cause longer

traffic disruption. The EPDO equates injury and fatal crashes to property damage only crashes, thus reflecting the severity. Project types that are most effective at reducing the frequency and severity of incidents will receive the highest scores as identified in the following scoring criteria:

5: EPDO greater than 300

4: EPDO between 200 and 300

3: EPDO between 125 and 200

2: EPDO between 75 and 125

1: EPDO between 25 and 75

0: EPDO less than 25

Step 3: Determine the impact of weather events. The effectiveness of the project to reduce the impact of weather within the project study area will be based on the type of project. Project types that are most effective at reducing the impacts of weather will receive the highest scores as identified in the following scoring criteria:

2: Projects directly mitigate weather impacts by geometric improvements or end-to-end detection or warning systems

1: Projects that contain a component of an end-to-end detection or warning system or mitigate the event (e.g., improved detour routes, expanded transit operations)

0: No impact

While most projects provide one benefit in mitigating weather events per the project type listed in **Table 10.5**, there are complex projects that provide more than one benefit. For those projects, the total score of the impact of weather events is found by adding the maximum value of one benefit (i.e., 1 or 2) to 10% of the value of the remaining benefits. For example, if a project adds a bridge heating system and a reversible lane, its score is 2 (bridge heating system) + 10%x 1 (reversible lane) = 2.1

Step 4: Determine the frequency of weather events using historical weather data. VDOT will compile three years of historical weather data within the project limits. The magnitude of weather events will be determined from historical data and scores will be assigned according to the following criteria:

2: More than 40 hours of combined moderate/severe snow events and flood events per year

1: Between 20 and 40 hours of combined moderate/severe snow events and flood events per year

0: Less than 20 hours of combined moderate/severe snow events and flood events per year

Step 5: Compute the BI of the roadway. The Regional Integrated Travel Information System (RITIS), offered through VDOT's participation with the I-95 Corridor Coalition provides a tool to calculate the BI. The RITIS system can provide the BI for all interstates and most primary routes. Where BI data is not available, it can be assumed that the BI is zero if no congestion or reliability issues are observed.

Step 6: Compute the travel time reliability measure. To compute travel time reliability, add the product of the incident impact (from Step 1) and the incident frequency (from Step 2) to the product of the weather impact (from Step 3) and the weather frequency (from Step 4), then multiply this result by the BI (from Step 5).

The methodology to determine travel time reliability for transit and TDM (including park and ride lots) projects uses this defined process as they are included as project impacts in **Table 10.5**. Bicycle/pedestrian projects are not applicable. Project features which are considered to have no impact in both incident and weather categories include: Bus turnouts, ramp turn restrictions (time of day), transit AVL (traveler information), shorter headway, larger bus capacity, and additional bus stops.

Scoring Value

The travel time reliability measure estimated in Step 6 above is multiplied by corridor VMT to scale the scoring results.

Table 10.5 Incident, Weather and Work Zone Impact Scoring

Major Project Type	Sub Project Type	Incidents Impact	Weather Impact
Median Design	Emergency crossovers, Controlled/Gated turnaround	2	1
	Moveable traffic barriers	0	1
	Movable cable median barrier	1	1
	High median barriers	1	0
	Traversable medians	1	0
	Accessible/widen shoulder to 10 feet	2	1
Shoulder Design	Drivable shoulder to 11-12 feet	2	1
	Hard shoulder running/Dynamic shoulders	2	1
	Emergency pull-offs/Turnouts, Crash investigation sites	2	0
Ramps Design and Use	Ramp widening (All lanes)	2	1
	Ramp closure (time of day)	1	1
	Off-ramp terminal traffic control	2	0
Truck Incident Design	Runaway truck ramps	2	0
Travel Lanes Design	Add travel lanes	2	1
	Interchange modifications – ramps	2	1

Major Project Type	Sub Project Type	Incidents Impact	Weather Impact
	Intersection modifications – turning lanes	2	1
Animal-Vehicle Collision	Wildlife fencing over/underpass	1	0
Lane Types and Use	Contra-flow lanes (no-notice evacuation will be scored w/ weather)	0	2
	Adding HOV lanes / HOT lanes	2	1
	Dual facilities (bypass lanes)	2	1
	Reversible lanes	1	1
	Lane reconfigurations to improve capacity or improve safety (static change, i.e., lane stripes)	1	0
Traffic Signals	Emergency vehicle traffic signal improvements	2	0
	Signal timing systems	1	0
Active Traffic Mgmt	Dynamic ramp metering / flow signals	1	1
	Variable speed limit / reduction	2	2
	Connected Vehicle System integration	2	2
	Over-height vehicle detection system	2	0
	Truck roll over warning	2	0
	Queue warning	2	0
	Integrated Corridor Management (alt routes/modes)	1	1
	Dynamic lane merging	1	0
Tolling	Converting to all electronic tolling	1	0
Weather	Fog detection warning system	0	2
	RWIS	0	2
	Flood warning systems / Wind warning systems	0	2
	Bridge heating systems / Anti-icing	0	2
	Drainage improvements	0	2
Incident Management	Incident clearance – pre-staged incident response, incentive-based towing, emergency relocation programs	2	0
	Safety Service Patrol	2	1
	Improvements to detour routes	2	1
	Reference location signs	1	0
	Incident detection / CAD integration	2	0
TDM	Traveler Information/ Travel Time Information: DDMS	1	1
Transit	Additional trains on existing rail lines	0	1
	New rail lines	0	1
	New rail station / intermodal connection	0	1
	New bus route	0	1

11.0 Appendix F: Land Use Coordination Measure

Table 11.1 Land Use Factor – Measure Summary

ID	Measure Name	Weight	Measure Description	Measure Objective
L.1	Future transportation efficient land use	(*)	Evaluates the amount of population and employment located in areas with high non-work accessibility	To determine the degree to which the project supports population and employment that on averages has a reduced impact on the transportation network
L.2	Increase in Transportation Efficient Land Use	(*)	Evaluates the increase in amount of population and employment located in areas with high non-work accessibility between present-day and the horizon year of 2030	To determine the degree to which the project supports population and employment that on averages has a reduced impact on the transportation network

* Up to 100% added to final score based on normalized measure performance

11.1 L.1 Future Transportation Efficient Land Use

Definition

The measure reports a project's support for transportation efficiency based on the amount and pattern of future development. The measure is based on (1) the amount of population and employment in 2030 and (2) the non-work accessibility, or the number of key non-work destinations that are accessible within a reasonable walking distance. Research and analysis have demonstrated that areas with a high level of non-work accessibility result in fewer vehicle miles traveled per household than in areas with less non-work accessibility with reductions of as much as 66% per household.

Data Sources

- Accessibility tool
- Change in local pedestrian network and network conditions
- Horizon year, 2030, population and employment

Methodology

The accessibility tool reports access to non-work destinations by walking as a composite value at the individual U.S. Census block level. The analysis considers how well local land uses around the project support access to a variety of destinations within a reasonable walking distance. Current non-work destinations considering the impact of the project will be used. Proposed changes to transportation networks are included in the analysis; those that improve walking access to destinations will improve scores, while any that impede walking access will reduce scores.

A composite value of local access to non-work destinations was established by analyzing existing patterns throughout Virginia. This value, described in **Table 11.2**, assigns points for different types of non-work destinations accessible by walking, based on the maximum expected number of occurrences for each destination type statewide. Similar to the access to jobs analysis, destinations are evaluated using a decay curve where destinations within a shorter travel time are weighted more than destinations farther away. The decay function was developed based on travel survey data. Every location in Virginia earns a value between 0 and 100.

Table 11.2 Local Non-Work Access Value

Destination Type	Definition (specific destinations included)	Points per destination
Bank	Bank, ATM	0.74 (up to 15 occurrences)
Education	School	5.6 (up to 2 occurrences)
Entertainment	Cinema, Performing Arts, Museum, Nightlife, Sports Complex, Convention/Exhibition Center, Sports Center, Animal Park	5.6 (up to 2 occurrences)
Food & Drink	Restaurants, Coffee Shop, Winery, Bar or Pub	0.25 (up to 45 occurrences)
Grocery	Grocery	3.7 (up to 3 occurrences)
Healthcare	Hospital, Medical Service, Pharmacy	3.7 (up to 3 occurrences)
Public Services	Library, Post Office, Community Center, City Hall, Court House, Police Station	3.7 (up to 3 occurrences)
Recreation	Golf Course, Ice Skating Rink, Campground, Park/Recreation Area	3.7 (up to 3 occurrences)
Shopping	Shopping, Convenience Store, Clothing Store, Department Store, Specialty Store, Home Improvement & Hardware Store, Office Supply & Service Store, Bookstore, Home Specialty Store, Sporting Goods Store, Consumer Electronic Store	0.34 (up to 33 occurrences)
Total points		**100**

Step 1: Update transportation networks in the accessibility tool to reflect new or changed links that the proposed project will provide. The tool imposes impedances on certain walking conditions automatically. Measure development involves scanning the project area carefully using aerial imagery for links that are legally walkable but that average people would avoid, such as crossings of unsignalized freeway ramps or narrow bridges with narrow shoulders and no

pedestrian accommodations; any of these links within a 1-mile buffer of the project are removed.

Step 2: Use the accessibility tool with a destination-decay rate for the walking mode to calculate post-project non-work accessibility to the weighted destinations in **Table 11.2** for each Census block in a 1-mile buffer of the project.

Step 3: Obtain horizon-year population and employment for all Census blocks in the 1-mile study area. For each block, calculate the sum to obtain the future job population.

Scoring Value

L.1 – Non-Work Accessibility x Future Density

The post-project non-work accessibility value for each block is multiplied by the future job-population density of each block, and these values are averaged

L.1 Measure = Average for all blocks of [Future Job-Population Density x Post-Project Non-Work Accessibility Value]

11.2 L.2 INCREASE IN TRANSPORTATION EFFICIENT LAND USE

Definition

This measure uses the same inputs as the L.1 measure, but it evaluates the increase in the amount of population and employment located in areas with high non-work accessibility. The measure is based on (1) the change in the amount of population and employment between today and the horizon year of 2030 and (2) the non-work accessibility, or the number of key non-work destinations that are accessible within a reasonable walking distance.

Data Sources

- Accessibility tool
- Change in local pedestrian network and network conditions
- Current year and horizon year, 2030, population and employment

Methodology

The accessibility tool reports access to non-work destinations by walking as a composite value at the individual U.S. Census block level. The analysis considers how well local land uses around the project support access to a variety of destinations within a reasonable walking distance. Current non-work destinations considering the impact of the project will be used. Proposed changes to transportation networks are included in the analysis; those that improve walking

access to destinations will improve scores, while any that impede walking access will reduce scores.

A composite value of local access to non-work destinations was established by analyzing existing patterns throughout Virginia. This value, described in the previous section in **Table 11.2**, assigns points for different types of non-work destinations accessible by walking, based on the maximum expected number of occurrences for each destination type statewide.

Step 1: Update transportation networks in the accessibility tool to reflect new or changed links that the proposed project will provide. The tool imposes impedances on certain walking conditions automatically. Measure development involves scanning the project area carefully using aerial imagery for links that are legally walkable but that average people would avoid, such as crossings of unsignalized freeway ramps or narrow bridges with narrow shoulders and no pedestrian accommodations; any of these links within a 1-mile buffer of the project are removed.

Step 2: Use the accessibility tool with a destination-decay rate for the walking mode to calculate post-project non-work accessibility to the weighted destinations in **Table 11.2** for each Census block in a 1-mile buffer of the project.

Step 3: Calculate the difference between the existing and horizon-year job-population (the sum of population and employment for all Census blocks in the 1-mile study area. For each block, calculate the sum to obtain the future job population.

Scoring Value

L.2 - Non-Work Accessibility – Change in Density

The post-project non-work accessibility value is multiplied by the expected change in job-population density of each block, and these values are averaged

L.2 Measure = Average of all blocks of [(Future Job-Population Density – Existing Job-Population Density) x Post-Project Accessibility Value]

12.0 Appendix G: NEPA Analysis Criteria

12.1 REQUIRED INFORMATION

The following information enables VDOT to make a preliminary determination on the level of NEPA document necessary for a project included in a SMART SCALE application:

- A detailed sketch, clearly differentiating elements of the proposed project from existing conditions and showing potential right-of-way impacts.
- A clear project description listing all project elements, for example accurate lengths of proposed through or auxiliary lanes.
- Summary conclusion or evidence of an alternatives analysis for projects that include new alignment or new capacity.

12.2 DETERMINATION CRITERIA

The following criteria would inform an informal decision by VDOT on the level of NEPA document assumed for the SMART SCALE analysis. While confirmation of the following criteria is not required to be submitted as part of a SMART SCALE application, it is illustrative of the type of information that would be required in NEPA and may also be used to inform applicants of where a project may fall on the spectrum of NEPA documents. The same criteria would apply to a final determination on the level of NEPA document, which is not made during the SMART SCALE application process.

Programmatic Categorical Exclusion (PCE)

- No more than minor amounts of ROW acquisition
- No residential, commercial, or industrial relocations or displacements
- No added or new capacity expansion from:
  - A new through lane that carries traffic for 2,500 feet or more
  - Intersection reconfigurations that include an additional through lane
- No new alignment
- No major traffic disruptions
- Not a Type I for Noise per the VDOT Noise Manual
- No significant impacts to resources

  - No adverse effect on historic properties—resources eligible for or listed in the National Register of Historic Places — under Section 106 of the National Historic Preservation Act
  - No more than a de minimis impact for properties protected by Section 4(f) of the Department of Transportation Act
  - Does not require the acquisition of lands under the protection of Section 6(f) of the Land and Water Conservation Act
  - Is not likely to adversely affect federally listed species or designated critical habitat, with the exception of a "may affect, likely to adversely affect" (MALAA) determination for a species with a Section 7 programmatic biological opinion.
- Does not require a United States Army Corps of Engineers (USACE) Section 404 (33 U.S.C. § 1344) Individual Permit or a United States Coast Guard (USCG) bridge permit (33 U.S.C. § 401)
- Does not involve a known potential hazardous material issue
- Does not cause disproportionate and adverse effects to any minority or low-income populations/Environmental Justice (EJ) community:
  - Does not include major traffic disruptions,
  - No more than minor amounts of temporary or permanent right-of-way acquisitions,
  - No more than limited displacements,
  - No community disruptions,
  - No disruptions of emergency services.

Any exceedance of a threshold above elevates the project to a Categorical Exclusion (CE) or an Environmental Assessment (EA).

Categorical Exclusion (CE)

- New Park and Ride facilities are CEs
- Could be Type I for noise per the VDOT Noise Manual
- Could have minor amounts of relocation, dependent on coordination with FHWA
- Could have more than minor amounts of ROW acquisition
- May have known controversy related to relocations
- Could be new alignment or realignment but is dependent scope. Anticipated impacts should be minimal.
- Could have added/new capacity

- Fits within the c-list or d-list categories, consistent with FHWA's approved Categorical Exclusions (23 CFR 771.117)

An action for which a determination as a CE cannot be made and the significance of its effect on the human (built) and natural environment is unknown, requires the preparation of an EA to determine the appropriate environmental document required. If additional analysis is required to know whether the potential for significant impact exists, then an EA may be appropriate.

Environmental Analysis (EA)

An EA (or above) will be required if impacts to resources are unknown.

- Does not fit within the c-list or d-list categories per 23 CFR 771.117
- Could have relocations
- Could have more than minor amount of ROW acquisition
- Could be new alignment
- Could have added/new capacity
- Could have new through lane and/or could be considered a major widening
- Could have known Disproportionately Adverse Effects (DAE) impacts to any EJ community
- If a preliminary determination on the required level of NEPA document indicates a need for a Multi-alternative EA (MEA) or Environmental Impact Statement (EIS), a locally preferred alternative must be identified as part of the application. Note that VDOT administers all MEAs and EISs.

The above is applicable with the CEQ regulations at the time of publishing. If policy changes go into effect, existing preliminary NEPA determinations may no longer be valid.

13.0 Appendix H: Readiness Gates

13.1 READINESS GATE VALIDATION PROCESS

As discussed in Chapter 2, applicants must clear three readiness gates during the application development process to ensure that the required supporting documentation is completed and provided to staff in a timely manner. The readiness gates are designed to clearly communicate document and timeline requirements and formalize the staff review process within the SMART Portal.

The readiness gates govern the timeline and staff review process for required documents, but not the requirements themselves. SMART SCALE document requirements were established and modified throughout the program's history and are based on VDOT policy, scoring needs, and engineering best practices. More information about document requirements, including document details and a list of warnings found in the Portal, can be found in **Section 2.4**. The readiness gates will not replace the pre-application and full application screening and validation processes as described in **Section 2.0**.

Gate 1 (Applicant Responsibility): Pre-Application Submission

While creating the initial pre-application, applicants will be provided with the supporting document requirements for each selected feature as well as a list of VDOT staff required to be engaged to satisfy Gate 2. Applicants must check a box in the Portal to acknowledge the requirements for the pre-application to be submitted.

Gate 2 (State Responsibility): Pre-Application to Full Application Conversion

For certain high-risk documents, VDOT staff must be engaged in the creation or review of the document before the April 1st pre-application submission deadline. The features with Gate 2 requirements are:

- Add New Through Lane(s), if a major widening;
- Managed Lane(s) (HOV/HOT/Shoulder), if a major widening;
- Improve Grade-Separated Interchange;
- Innovative Interchange;
- Ramp Improvement(s), if not limited to acceleration/deceleration lanes; and
- Roadway on New Alignment.

The required staff to be engaged is provided in the Portal at the time of application creation and in **Section 13.2**. During pre-application validation from April 1st to April 30th, staff will confirm for each document that they were engaged by the applicant and that the document is on track to be completed before July 15th. All high-risk documents must have staff concurrence before the pre-application can be converted to a full application.

Gate 3 (State Responsibility): Full Application Submission

As applicants provide final supporting documents in the Full Application editing phase, VDOT or DRPT staff will confirm that they have reviewed each document and agree that it fulfills the requirements of the associated feature. All supporting documents must be uploaded before July 15th to allow time for staff review and confirmation before the August 1st submission deadline. All documents must have Gate 3 confirmation before the full application can be submitted.

Table 13.1 includes the confirmation responsibility, completion date, and confirmation text found in the Portal for each gate. While VDOT staff is responsible for the Gate 2 confirmation, the applicant is responsible for engaging the Gate 2 staff in the creation or review of the required document in a timely manner.

Table 13.1 Readiness Gate Completion Details

Readiness Gate	Confirmation Responsibility	Completion Date	Confirmation Text
Gate 1: Pre-Application Submission	Applicant	April 1st	Applicant acknowledges the above requirements and confirms that the supporting document for this feature will be completed and provided before July 15th.
Gate 2: Pre-Application to Full Application Conversion	VDOT staff	April 30th	Staff confirms that they have been engaged in the creation timelior review of the required supporting document for this feature and believe that the document will be completed before July 15th.
Gate 3: Full Application Submission	VDOT staff	July 15th	Staff confirms that the provided document satisfies the above requirements and has no outstanding issues.

13.2 DOCUMENT REQUIREMENTS AND STAFF CONFIRMATIONS

This section provides feature-specific details for the readiness gates including the document requirements, a general description of the conditions triggering the requirements, and a list of VDOT staff who will be providing Portal confirmation as described in **Table 13.1**.

Add New Through Lane(s)

Document:	**Planning/Safety study with operational analysis.**
Conditions:	All selections
Gate 3 Confirmations:	• District Traffic Engineer • Assistant State L&D Engineer (if on CoSS or APN)

Document:	**Alternatives analysis considering improvements without widening**
Conditions:	Project includes a major widening (2 or more new lanes)
Gate 2 Confirmations:	• District L&D Engineer
Gate 3 Confirmations:	• District L&D Engineer • District Traffic Engineer • Assistant State L&D Engineer

Managed Lane(s) (HOV/HOT/Shoulder)

Document:	**Planning/Safety study with operational analysis.**
Conditions:	All selections
Gate 3 Confirmations:	• District Traffic Engineer • Assistant State L&D Engineer (if on CoSS or APN)

Document:	**Alternatives analysis considering improvements without widening**
Conditions:	Project includes a major widening (2 or more new lanes)
Gate 2 Confirmations:	• District L&D Engineer • Assistant State Traffic Engineer (if on CoSS or APN)
Gate 3 Confirmations:	• District L&D Engineer • District Traffic Engineer • Assistant State L&D Engineer • Assistant State Traffic Engineer (if on CoSS or APN)

Construct or Convert Existing General-Purpose or Parking Lane to Bus-Only Lane

Document:	**Operational Analysis (HCS, Synchro, etc)**
Conditions:	All selections
Gate 3 Confirmations:	• District Traffic Engineer • Assistant State Traffic Engineer (if on CoSS or APN)

Construct or Improve At-Grade Bike/Pedestrian Crossing

Document:	**Completed SS02 Uncontrolled Crossing Study form or equivalent study**
Conditions:	Project includes a pedestrian crossing at an uncontrolled approach or mid-block location.
Gate 3 Confirmations:	• District Traffic Engineer

Improve Grade-Separated Interchange

Document:	**Draft or final IAR or OSAR with a signed LD-459 Framework Document**
Conditions:	All selections
Gate 2 Confirmations:	• District L&D Engineer
Gate 3 Confirmations:	• District L&D Engineer • District Environmental Manager • District Traffic Engineer • District Planner • District Project Development Engineer • Assistant State L&D Engineer

Innovative Interchange

Document:	**Draft or final IAR or OSAR with a signed LD-459 Framework Document***
Conditions:	All selections
Gate 2 Confirmations:	• District L&D Engineer • Assistant State Traffic Engineer
Gate 3 Confirmations:	• District L&D Engineer • Assistant State Traffic Engineer • District Environmental Manager • District Traffic Engineer • District Planner • District Project Development Engineer • Assistant State L&D Engineer

* For new interchanges, refer to the requirements for the New Interchange feature. For improvements to existing interchanges, refer to the requirements for the Improve Grade-Separated Interchange feature.

Innovative Intersection(s)

Document:	**Operational analysis (HCS, Synchro, etc)**
Conditions:	All selections
Gate 3 Confirmations:	• District Traffic Engineer

Document:	**Completed iCAP assessment or equivalent documentation**
Conditions:	If on CoSS or APN
Gate 3 Confirmations:	• District Traffic Engineer

Intersection Improvement(s)

Document:	**Completed iCAP assessment or equivalent documentation**
Conditions:	If on CoSS or APN and project includes modifying the intersection configuration
Gate 3 Confirmations:	• District Traffic Engineer

ITS Improvement(s) / Advanced Signal Control

Document:	**Planning/Safety study with operational analysis**
Conditions:	Project includes corridor-level advanced signal control improvements.
Gate 3 Confirmations:	• District Traffic Engineer • Assistant State Traffic Engineer (if CoSS or APN)

New Interchange, Limited Access Facility OR New Interchange, Non-Limited Access Facility

Document:	**Draft or final IAR with a signed LD-459 Framework Document**
Conditions:	All selections
Gate 2 Confirmations:	• District L&D Engineer
Gate 3 Confirmations:	• District L&D Engineer • District Environmental Manager • District Traffic Engineer • District Planner • District Project Development Engineer • Assistant State L&D Engineer

New Intersection

Document:	**Completed iCAP assessment or equivalent documentation**
Conditions:	If on CoSS or APN
Gate 3 Confirmations:	• District Traffic Engineer

New Traffic Signal

Document:	**Approved Signal Justification Report (SJR)**
Conditions:	All selections
Gate 3 Confirmations:	• District Traffic Engineer • Assistant State Traffic Engineer (if on APN)

Ramp Improvement(s)

Document:	**Draft or final OSAR with signed LD-459 Framework Document**
Conditions:	Project includes modifications to the interchange configuration
Gate 2 Confirmations:	• District L&D Engineer
Gate 3 Confirmations:	• District L&D Engineer • District Environmental Manager • District Traffic Engineer • District Planner • District Project Development Engineer • Assistant State L&D Engineer

Roadway Reconfiguration

Document:	**Traffic operational analysis (HCS, Synchro, etc.)**
Conditions:	All selections
Gate 3 Confirmations:	• District Traffic Engineer

Turn Lane Improvement(s)

Document:	**Turning movement counts**
Conditions:	Project includes a new turn lane
Gate 3 Confirmations:	• District Traffic Engineer

Roadway on New Alignment

Document:	**Planning/Safety study with alternatives analysis considering improvements not on a new alignment**
Conditions:	All selections
Gate 2 Confirmations:	• District L&D Engineer
Gate 3 Confirmations:	• District L&D Engineer • District Traffic Engineer • District Environmental Manager • Assistant State L&D Engineer

Construct/Expand Bus Facility

Document:	**TDP, Comp Plan, LRTP, or equivalent study which documents recommendations consistent with the project scope. Completed SS04 Transit Environmental Review Form.**
Conditions:	All selections
Gate 3 Confirmations:	• DRPT Statewide Transit Planner

New High-Capacity or Fixed-Guideway Route/Service

Document:	**TDP, Comp Plan, LRTP, or equivalent study which documents recommendations consistent with the project scope. Completed SS04 Transit Environmental Review Form.**
Conditions:	All selections
Gate 3 Confirmations:	• DRPT Statewide Transit Planner

Freight Rail Improvements

Document:	**Conceptual (10%) design plans consistent with the project scope. Carload projects and a letter of support from the stakeholder railroad owner or operator.**
Conditions:	All selections
Gate 3 Confirmations:	• DRPT Director of Rail Planning

Intercity Passenger Rail Service Improvements

Document:	**Planning Study/Feasibility Study including ridership projections, route alignment, proposed stops, and draft schedule. Conceptual (10%) design plans consistent with the project scope and a letter of support from the stakeholder railroad owner or operator.**
Conditions:	All selections
Gate 3 Confirmations:	• DRPT Director of Rail Planning

New Intercity Passenger Rail Station or Station Improvements

Document:	**Planning Study/Feasibility Study including ridership projections, route alignment, proposed stops, and draft schedule. Conceptual (10%) design plans consistent with the project scope and a letter of support from the stakeholder railroad owner or operator.**
Conditions:	All selections
Gate 3 Confirmations:	• DRPT Director of Rail Planning

New Station or Station Improvements

Document:	**Planning Study/Feasibility Study documenting a locally preferred alternative consistent with the project scope.**
Conditions:	All selections
Gate 3 Confirmations:	• DRPT Director of Rail Planning

14.0 Appendix H: List of Acronyms

AADT	Annual average daily traffic
BOS	Board of Supervisors
BI	Buffer Index used in calculation of reliability measure
BPR	Bureau of Public Roads
CAP-X	FHWA Capacity Analysis for Planning of Junctions analysis tool
CE	Categorical Exclusion (NEPA)
CN	Construction phase for schedule and cost estimates
CMAQ	Congestion Mitigation and Air Quality Improvement Program
CoSS	Corridors of Statewide Significance
CTB	Commonwealth Transportation Board
DRPT	Virginia Department of Rail and Public Transportation
DGP	District Grant Program
EPDO	Equivalent Property Damage Only, crash value defined by FHWA
FAMPO	Fredericksburg Area MPO
FAST	Fixing America's Surface Transportation Act, federal transportation bill
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact (NEPA)
FTA	Federal Transit Administration
GIS	Geographic Information Systems
HCS	Highway Capacity Software
HPP	High-Priority Projects Program
HRTPO	Hampton Roads TPO
HSIP	Highway Safety Improvement Program
HSM	AASHTO Highway Safety Manual
IJR	Interchange Justification Request
IMR	Interchange Modification Report
MAP-21	"Moving Ahead for Progress in the 21st Century" Act, federal transportation bill
MPO	Metropolitan Planning Organization

NEPA	National Environmental Policy Act process
NTD	National Transit Database
NVTA	Northern Virginia Transportation Authority
OIPI	Office of Intermodal Planning and Investment
PDC	Planning District Commission
PE	Preliminary Engineering phase for schedule and cost estimates
QA/QC	Quality Assurance/Quality Control
RITIS	University of Maryland Regional Integrated Transportation Information System
RN	Regional Networks
RNS	VDOT Roadway Network System
ROD	Record of Decision (NEPA)
RRTPO	Richmond Regional TPO
RVTPO	Roanoke Valley TPO
RW	Right-of-Way phase for schedule and cost estimates
SGR	State of Good Repair Program
SPR	State Planning and Research funding
STBG	Surface Transportation Block Grant Program
STIP	State Transportation Improvement Program
SYIP	Six-Year Improvement Program
TA	Transportation Alternatives Set-Aside funds
TIP	Transportation Improvement Program
TMS	VDOT Traffic Monitoring System
TOD	Traffic Operations Division
TPB	National Capital Region Transportation Planning Board
UDA	Urban Development Areas
VACO	Virginia Association of Counties
VDOT	Virginia Department of Transportation
VHT	Vehicle Hours of Travel
VML	Virginia Municipal League
VMTP	Virginia Multimodal Transportation Plan
VTA	Virginia Transit Association