

## 4.13 Systems Engineering Analysis (SEA)

The SEA is a project delivery process for technology. This includes any technology that impacts the safety or efficiency of the roadway. The SEA process takes project managers step by step through the design of technology using templates. It is structured to prompt and document critical discussions at the proper time in design. It is also intended to reduce risk by facilitating additional planning during the design phase.

Project Managers will take the following steps to initiate the SEA process:

- During pre-scoping, complete the Technology/SEA Assessment template. All projects must complete and submit this form which is in OnTrack. This document can also be found on the ITS & Network Services - SEA Documents Website (<https://www.codot.gov/programs/intelligent-transportation-systems/systems-engineering-analysis-sea/sea-documents>). This template will walk a project manager through determining if a project has technology and therefore requires a SEA. Even if a project does not have technology and no SEA is required, it is still important to document that no additional SEA documentation is required.
- If an SEA is required, the Technology/SEA Assessment template will guide the PM through determining which of the 10 additional required SEA documents already have an existing document that can be modified to be project specific. If there is no previously prepared work, the PM will need to develop the document using the templates which can be found on the ITS & Network Service Branch website <https://www.codot.gov/programs/intelligent-transportation-systems/systems-engineering-analysis-sea/systems-engineering-analysis-sea>
- The remaining 10 SEA documents build on each other. In OnTrack, the SEA deliverables are tied to particular stage gates to ensure the documents are prepared at the correct time. The submission schedule can also be referenced using the ITS & Network Services - Document Submission Website (<https://www.codot.gov/programs/intelligent-transportation-systems/systems-engineering-analysis-sea/sea-document-submission>). For templates of all SEA documents reference the ITS & Network Services - SEA Documents Website <https://www.codot.gov/programs/intelligent-transportation-systems/systems-engineering-analysis-sea/sea-documents>.
- The date of the completion of the SEA process will need to be populated in the Form 1180.

### **4.13.1 Background**

The SEA is required per 23 Code of Federal Regulations (CFR) 940. Historically, it has been housed in the Operations Evaluation Tool. On September 1, 2021 the SEA was removed from the Operations Evaluation Tool and moved to OnTrack.

The SEA is a project delivery process for technology making OnTrack the appropriate tool for the SEA process. The SEA process was revamped in 2021 through the collaborative work of a project team led by the ITS & Network Service Branch involving subject matter experts from all five regions and HQ. This effort was sponsored by the Federal Highway Administration (FHWA) who was another integral component of the team.

The revamp was structured to ensure compliance with 23 CFR 940. Another objective was to ensure consistent technology design at CDOT through the use of the ITS Architecture Plan. The SEA focuses on the design of technology and ensures appropriate planning is in place for the technology to remain useful for its full lifecycle. This is why the SEA prescribes planning maintenance and asset management resources before the technology is implemented. The ultimate goal of the SEA is to ensure money and time spent deploying technology results in successful systems along with the longevity of technology solutions.

### **4.13.2 Roles and Responsibilities**

#### **4.13.2.1 Project Managers**

The project managers are responsible for determining the need for an SEA on a project through the use of the Technology/SEA Assessment template. If no SEA is needed, the PM only needs to complete the top portion and submit the form for verification of the correct assessment. No additional SEA documentation will be needed.

Should an SEA be required, the PM is responsible for preparing and submitting all 10 additional SEA documents. If the PM needs additional help, they can reach out to the ITS & Network Services Branch or the SEA Lead for support.

The PM will also be responsible for completing the Form 1180 which documents completion of the SEA process.

#### **4.13.2.2 ITS & Network Services Branch**

The Branch will be timely in their reviews of submitted SEA templates. The Branch will also maintain the ITS specifications published on the ITS & Network Services Branch - Specifications website(<https://www.codot.gov/programs/intelligent-transportation-systems/specifications>). These specifications will have to be referenced in completing the SEA documentation.

#### **4.13.2.3 SEA Lead**

Be the point of contact in the ITS & Network Services Branch to support PM's going through design. The SEA lead will coordinate all review of SEA documents, compile all comments, and return comments to the PM. This position will also assist PM's as they prepare SEA documents. This includes explaining the templates and the ITS Architecture Plan, coordinating support for the ITS & Network Services Branch, and any other additional support a project may need.

#### **4.13.2.4 FHWA**

FHWA will only be required to review the SEA documentation should the project be a project of division interest (PODI). On all federal aid projects, FHWA retains full federal authority and responsibility, and reserves the right to request individual review and/or approval of any SEA action.

#### **4.13.3 Additional References:**

1. *DB 2021-3 Systems Engineering Analysis Process*
2. *ITS & Network Services SEA website (<https://www.codot.gov/programs/intelligent-transportation-systems/systems-engineering-analysis-sea/systems-engineering-analysis-sea>) for additional information.*