**Pilot Project**

**for**

**Electronic Engineering Data**

**Use and Delivery**

Office of Engineering

AEC Applications - Division of Facilities & Transit

Connecticut DOT 

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Contents

[Section 1 Overview 3](#_Toc464551619)

[1.1 Problem to be addressed or improvement desired 3](#_Toc464551620)

[1.2 Goal of the pilot project 4](#_Toc464551621)

[1.3 Objective of the pilot project 4](#_Toc464551622)

[1.3.1 Phase 1 – delivery of 2D MicroStation CAD graphics and InRoads SS2 alignment data. 4](#_Toc464551623)

[1.3.2 Phase 2 – Phase 1 deliverables along with the top surface curb to curb using MicroStation and InRoads SS2 4](#_Toc464551624)

[1.3.3 Phase 3 – deliver a full 3D model using MicroStation and OpenRoads SS4 4](#_Toc464551625)

[1.4 Establishing Success Criteria 4](#_Toc464551626)

[Section 2 Resources 4](#_Toc464551627)

[2.1 Project Personnel 4](#_Toc464551628)

[2.1.1 Design Engineers of various pilot projects 4](#_Toc464551629)

[2.1.2 AEC Applications personnel 4](#_Toc464551630)

[2.1.3 Inspectors of various pilot projects 5](#_Toc464551631)

[2.2 Hardware 5](#_Toc464551632)

[2.2.1 Trimble Site Positioning Systems: Site Positioning Systems | Trimble Civil Engineering and Construction 5](#_Toc464551633)

[2.3 Software 5](#_Toc464551634)

[2.3.1 Standard CTDOT install of Bentley products for all designers 5](#_Toc464551635)

[2.3.2 Business Center - Heavy Construction Edition for AEC personnel 5](#_Toc464551636)

[2.3.3 SCS900 Site Controller Software 5](#_Toc464551637)

[2.4 Funding 5](#_Toc464551638)

[2.4.1 SPR-2253 for hardware/software purchases (State Project Number 0093-0164) 5](#_Toc464551639)

[Section 3 Start Date/Schedule 5](#_Toc464551640)

[Section 4 Procedures for Gathering Data for Pilot Evaluation 5](#_Toc464551641)

[Section 5 Risk Management 6](#_Toc464551642)

[5.1 Identify Risks 6](#_Toc464551643)

[5.2 Risk Mitigation 6](#_Toc464551644)

[5.3 Risk Transfer 6](#_Toc464551645)

[5.3.1 Allocate risks to the parties best able to manage them 6](#_Toc464551646)

[Section 6 Key Performance Indicators 6](#_Toc464551647)

[6.1 Planned Labor 6](#_Toc464551648)

[6.2 Labor spent 6](#_Toc464551649)

[6.3 Planned Dollars 6](#_Toc464551650)

[6.4 Dollars spent 6](#_Toc464551651)

[6.5 Planned delivery date 6](#_Toc464551652)

[6.6 Actual delivery date 7](#_Toc464551653)

[Section 7 Production Deployment Plan 7](#_Toc464551654)

[Section 8 Lessons Learned 7](#_Toc464551655)

[8.1 Things that went well 7](#_Toc464551656)

[8.2 Things that could have gone better 7](#_Toc464551657)

[Appendix A. Acronyms 7](#_Toc464551658)

# Overview

## Problem to be addressed or improvement desired

The high value Electronic Engineering Data (EED) that is being developed during design is not being passed onto the construction phase of the project. This data can be used to leverage new technologies in construction inspection, layout and machine control. It can also be used during the design phase for better estimates, visualization, and clash detection.

In order to accomplish this, another issue of the EED is that it frequently does not match the contract plans. Models are typically developed to a 50%-60% level of detail and then the final design is done by simply editing the graphics. CAD drafting standards are also not being adhered to.

## Goal of the pilot project

To implement and test a strategy for moving towards a model centric method of design and delivering those models (called Electronic Engineering Data or EED) for use during design and construction. There is also a secondary goal of improving CAD drafting practices.

## Objective of the pilot project

Deliver 2D/3D models of the design along with contract plans at FDP. This model will include 2D CAD graphics, alignments and surfaces that were used to develop the plans. This will be accomplished in three phases:

### Phase 1 – delivery of 2D MicroStation CAD graphics and InRoads SS2 alignment data. This phase will focus on improving CAD drafting practices.

### Phase 2 – Phase 1 deliverables along with the top surface curb to curb using MicroStation and InRoads SS2. This phase will focus on moving towards the delivery of 3D models by requiring the top surface from curb to curb of the project.

### Phase 3 – deliver a full 3D model using MicroStation and OpenRoads SS4. This phase is dependent on the implementation of Bentley’s design software, OpenRoads.

## Pilot Project List

For a list of pilot projects see [EED Pilots\_AEC\_Working\_.docx](pw://ctdot.projectwiseonline.com:CTDOT/Documents/D%7b9ae9520f-7333-456d-9964-5585e4008367%7d)

# Establishing Success Criteria

AEC will perform Q&A on the EED when it’s delivered at FDP. The data will also be tracked during the construction phase to see how it was used in the field.

# Resources

## Project Personnel

### Design Engineers of various pilot projects

### AEC Applications personnel

### Inspectors of various pilot projects

# Hardware

## Trimble Site Positioning Systems:

[Site Positioning Systems | Trimble Civil Engineering and Construction](http://construction.trimble.com/products-and-solutions/site-positioning-systems?q=products/site-positioning-systems)

## Software

### Standard CTDOT install of Bentley products for all designers

### Business Center - Heavy Construction Edition for AEC personnel, select construction inspectors

### SCS900 Site Controller Software on all hand held mobile devices

## Funding

### SPR-2253 for hardware/software purchases (State Project Number 0093-0164)

# Start Date/Schedule

**2013, May 2014 & February 2016 –** met with Connecticut Construction Industry Association

(CCIA) to inform contractors of CTDOT’s plans for EED and to hear find out what the contractors needed.

**April 12 & 13 2016** - AEC Applications hosted an Every Day Counts-3 FHWA workshop on 3D Engineered Models for Highway & Bridge Construction Workshop/Peer Exchange.

**June 2016 - Begin piloting delivery of EED at FDP**

[**EED Pilots\_AEC\_Working\_.docx**](pw://ctdot.projectwiseonline.com:CTDOT/Documents/D%7b9ae9520f-7333-456d-9964-5585e4008367%7d)

**July 11 & 18 2016** - Model Centric Roadway Design And Delivery Open House

**January 2017** – issue Phase 1 Directive

**June 2017** – issue Phase 2 Directive

**December 2017** – issue Phase 3 Directive

[EED\_All\_Phases\_AEC\_Working\_.mpp](pw://ctdot.projectwiseonline.com:CTDOT/Documents/D%7b089aa941-493c-420b-a602-ffc35e1e2434%7d)

# Procedures for Gathering Data for Pilot Evaluation

# Risk Management

## Identify Risks

### EED not matching contract plans

### Improper use of EED/mobile devices during construction phase

## Risk Mitigation

### Held a workshop and open houses to inform the users of what is expected and how to accomplish goals. This included CTDOT personnel, consultants and contractors.

### Q&A at delivery of EED at FDP [EED\_Checklist](pw://ctdot.projectwiseonline.com:CTDOT/Documents/D%7b28c7e4c1-73a9-4ffa-9306-c6580ef1445a%7d)

### Proficiency Rating of inspectors using EED in the field

[2016-07-28\_GPS Proficiency\_CN\_OOC\_Miscellaneous\_.pdf](pw://ctdot.projectwiseonline.com:CTDOT/Documents/D%7bd508b3a3-cd9a-4308-8a6d-63e061e22d0a%7d)

## Risk Transfer

### Allocate risks to the parties best able to manage them

Q&A at delivery of EED at FDP – initially AEC, then Deign project engineers

Improper use of EED/mobile devices during construction phase – OOC

# Key Performance Indicators

## Planned Labor

## Labor spent

## Planned Dollars

N/A

## Dollars spent

N/A

## Planned delivery date

See Section 5

## Actual delivery date

TBD

# Production Deployment Plan

Issue directives for the 3 phases after pilot projects have been completed

# Lessons Learned

*AEC report to be issued. To include a lists of all pilot projects.to include problems encountered, issues/problems that were avoided/mitigated from using the EED.*

## Things that went well

## Things that could have gone better

1. Acronyms

ALG - InRoads coordinate geometry alignment file

CCIA - Connecticut Construction Industry Association

DGN – MicroStation CAD graphics file

DTM – InRoads digital terrain model file

EED – Electronic Engineering Data

1. Tracking

