

FINAL REPORT

Principal Investigator: Dr. Ralph Ellis
Co-Principal Investigator: Dr. Marc Hoit
Co-Principal Investigator: Dr. Mike McVay
Graduate Research Assistant: Duzgun Agdas
FDOT Research Coordinator: Jim Johnson

**INTEGRATION OF XML SCHEMAS FOR THE EXCHANGE OF FDOT
CONSTRUCTION PROJECT DATA**

May 08

UF Contract Number 00061315

FDOT Contract Number FDOT BD-545 #71

**Department of Civil and Coastal Engineering
University of Florida
(352) 392-9537
<http://www.ce.ufl.edu/>**



The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the State of Florida Department of Transportation.

Prepared in cooperation with the Florida Department of Transportation and the U.S. Department of Transportation.

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.	
Integration of XML Schemas for the Exchange of FDOT Construction Project Data		5. Report Date May 2008	6. Performing Organization Code
		8. Performing Organization Report No. 00061315	
		10. Work Unit No. (TRAIS)	11. Contract or Grant No. BD545-71
7. Author(s) Dr. Ralph Ellis	9. Performing Organization Name and Address University of Florida Department of Civil and Coastal Engineering 365 Weil Hall / P.O. Box 116580 Gainesville, FL 32611-6580	13. Type of Report and Period Covered Draft Final Report 5/8/2006 – 5/29/2008	
12. Sponsoring Agency Name and Address Florida Department of Transportation Research Management Center 605 Suwannee Street, MS 30 Tallahassee, FL 32301-8064		14. Sponsoring Agency Code	
		15. Supplementary Notes Prepared in cooperation with the Federal Highway Administration	
16. Abstract <p>An investigation of the construction data management needs of the FDOT with regard to XML standards including development of data dictionary and data mapping. Review of existing XML schemas indicated the need for development of specific XML schemas. XML schemas were developed for all FDOT construction data management processes. Additionally, data entry, approval and data retrieval applications were developed for payroll compliance reporting and pile quantity payment development.</p>			
17. Key Words <p>Construction data management, XML, Schemas</p>		18. Distribution Statement <p>No restrictions. This document is available to the public through the National Technical Information Service, Springfield, VA, 22161</p>	
19. Security Classif. (of this report) Unclassified	20. Security Classif. (of this page) Unclassified	21. No. of Pages 137	22. Price

EXECUTIVE SUMMARY

The recent emergence of Extendable Markup Language (XML) offers a common data language for transferring data among software applications and users. The main advantage of using the technology is the fact that it does not require any specialized hardware or software and can be used in any platform provided they are XML compatible. The objective of this project was to investigate the enterprise data management needs of the Florida Department of Transportation (FDOT) with regard to construction data and where necessary develop appropriate XML schemas supporting specific FDOT data needs.

A comprehensive data dictionary was developed as a result of a detailed review of FDOT construction data reporting and processing. Data mapping was performed to further understand the data management needs.

A review of all current published XML schema standards was conducted including Trans XML and DIGGS. The review of existing XML schemas indicated the need for the development of specific schemas supporting the FDOT enterprise data activities. A total of 46 schemas were developed and tested. (These schemas are available as an Appendix to this report.)

Additionally, two specific data management applications were developed to support the FDOT construction data management needs. The first web based application was developed to permit contractors or third party consultants to submit payroll compliance data electronically to the FDOT. Approval and data storage features were also included. The second application permits the retrieval of data from a recently developed FDOT Geotech database for the purposes of developing pile quantities for payment purposes. This application is to be used by FDOT field Offices in preparing contract progress payments. (Detailed documentation on both applications is provided in the Appendixes to this report.)

Finally, the report offers recommendation for continued investment in data management conversions to XML standards and opportunities as the result of data transfer capabilities.

TABLE OF CONTENTS

EXECUTIVE SUMMARY	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES	vi
LIST OF FIGURES	xi
1. INTRODUCTION	1
Background and Project Objectives.....	1
Research Tasks	2
2. RESEARCH METHODOLOGY.....	4
Review of Data Exchange Needs	4
Data Dictionary.....	10
Review of Current Standards.....	10
Review of TransXML Documentation.....	10
Bid Package Schema	11
Construction Progress Schema.....	12
Design Project Schema.....	12
Linear Reference Schema.....	12
Material Sampling and Testing Schema.....	12
Project Construction Status Schema.....	13
Reference Schema	13
TransXML Base Schema.....	13
TransXML UML Diagrams.....	13
Review of the Current DIGGS Standards	14
DIGGS Data Dictionary.....	17
Findings	17
3. NECESSARY SCHEMA DEVELOPMENT	18
Schema development process	18
Drilled Shaft Log Schema Development.....	18
Complete List of Created Schemas	26
Synergies with TransXML and DIGGS	27
Findings	27
4. DEVELOPMENT OF SUPPORTING DATA MANAGEMENT APPLICATIONS...29	
Wage and Hour Record Application.....	29
Background.....	29
Developing the Application Platform.....	30
Entering Data and Submitting Wage and Hour Record From.....	30

Entering Data on the Form	30
Navigating through Database	32
Developing the Pile Driving Records application	37
Downloading Pile Quantities from the Database	37
Findings	39
5. CONCLUSIONS AND RECOMMENDATIONS	40
Conclusions.....	40
Recommendations.....	40
APPENDIX A FDOT CONSTRUCTION FORMS REVIEW AND DATA DICTIONARY	41
APPENDIX B SUPPORTING APPLICATION OUTLINES.....	109
APPENDIX C SCHEMA RESEARCH DOCUMENTATION	114
APPENDIX D PAYROLL REPORTING APPLICATION AND SUPPORTING DOCUMENTS	114
APPENDIX E PILE QUANTITIES APPLICATION.....	114

LIST OF TABLES

Table	Page
Table 2-1 Selected Construction Office Construction Forms.....	5
Table 2-2 Selected Equal Employment Opportunity Office Construction Forms.....	6
Table 2-3 Selected State Materials Office Construction Forms.....	9
Table 2-4 Initial Data Dictionary Snapshot.....	10
Table A-1 Aviation Office Construction Forms.....	41
Table A-2 Office of Comptroller Construction Forms.....	41
Table A-3 Construction Office Construction Forms.....	41
Table A-4 Contracts Administration Office Construction Forms.....	44
Table A-5 Environmental Management Office Construction Forms.....	45
Table A-6 Equal Employment Opportunity Office Construction Forms.....	45
Table A-7 Estimates Office Construction Forms.....	47
Table A-8 Financial Development Office Construction Forms.....	47
Table A-9 Office of General Counsel Construction Forms.....	47
Table A-10 Office of Information Systems Construction Forms.....	47
Table A-11 Office of General Inspector Construction Forms.....	48
Table A-12 ITS Program Office Construction Forms.....	48
Table A-13 Maintenance Office Construction Forms.....	48
Table A-14 State Materials Office Construction Forms.....	49
Table A-15 Personnel Resource Office Construction Forms.....	50
Table A-16 Office of Policy Planning Construction Forms.....	50
Table A-17 Procurement Office Construction Forms.....	51
Table A-18 Project Management and Development Office Construction Forms.....	51
Table A-19 Public Transportation and Modal Administrator Office Construction Forms.....	52

Table A-20 Rail Office Construction Forms	52
Table A-21 Office of Right of Way Construction Forms	53
Table A-22 Roadway Design Office Construction Forms.....	55
Table A-23 Safety Office Construction Forms	55
Table A-24 Specifications Office Construction Forms	56
Table A-25 Structures Office Construction Forms	56
Table A-26 Support Services Office Construction Forms	56
Table A-27 Systems Planning Office Construction Forms.....	56
Table A-28 Traffic Engineering and Operations Office Construction Forms	57
Table A-29 Transit Office Construction Forms.....	57
Table A-30 Turnpike Enterprise Office Construction Forms	58
Table A-31 Utilities Office Construction Forms	58
Table A-32 Selected Construction Office Construction Forms	59
Table A-33 Selected Equal Employment Opportunity Office Construction Forms	59
Table A-34 Selected Materials Office Construction Forms	60
Table A-35 Data inventory of MOT Review Report	60
Table A-36 Work Plan Controlling Item Of Work Form Data Inventory	62
Table A-37 Contractors Past Performance Report Data Inventory	63
Table A-38 Engineers Maintenance Of Traffic Evaluation At Crash Site Form Data Inventory	63
Table A-39 Wage And Hour Record Data Inventory	64
Table A-40 Drilled Shaft Log Data Inventory	65
Table A-41 Drilled Shaft Rock Excavation Log Data Inventory	66
Table A-42 Drilled Shaft Concrete Placement Log Data Inventory.....	67
Table A-43 Piling Tabulation Data Inventory	69

Table A-44 O.J.T. Monthly Time Report - Asphalt Iuteman Raker Form Data Inventory	69
Table A-45 OJT schedule conformity data inventory.....	70
Table A-46 Trainee enrollment and notice of personnel action form data inventory.....	71
Table A-47 O.J.T. monthly time report - Concrete curb/sidewalk machine operator data inventory	73
Table A-48 O.J.T. monthly time report - Erosion control specialist data dictionary	73
Table A-49 O.J.T. monthly time report - Earth wall erector data inventory	74
Table A-50 O.J.T. monthly time report - Installer/Tester form data inventory	75
Table A-51 O.J.T. monthly time report - Roller operator data inventory.....	76
Table A-52 O.J.T. monthly time report - Front-end loader operator data inventory	76
Table A-53 O.J.T. monthly time report-Highway or bridge ironworker, reinforcing, data inventory	77
Table A-54 O.J.T. monthly time report - Scraper-Pan operator data inventory	78
Table A-55 O.J.T. monthly time report - Form/Curb & gutter builder data inventory	79
Table A-56 O.J.T. monthly time report - Grade checker data inventory	79
Table A-57 O.J.T. monthly time report - Asphalt/Bridge deck screed operator data inventory.....	80
Table A-58 O.J.T. monthly time report - Highway concrete finisher data inventory.....	81
Table A-59 O.J.T. monthly time report - Highway or bridge carpenter data inventory	82
Table A-60 O.J.T. monthly time report - Pipelayer data inventory	82
Table A-61 O.J.T. monthly time report - Backhoe operator data inventory.....	83
Table A-62 O.J.T. monthly time report - Painter, highway or bridge data inventory	84
Table A-63 O.J.T. monthly time report - Air compressor operator data inventory	84
Table A-64 O.J.T. monthly time report - Asphalt distributor data inventory	85
Table A-65 O.J.T. monthly time report - Asphalt paving machine operator data inventory.....	86

Table A-66 O.J.T. monthly time report - Asphalt plant drier operator data inventory.....	87
Table A-67 Certification of subcontract amount to DBE contractor data inventory	87
Table A-68 O.J.T. monthly time report equipment maintenance technician data inventory.....	88
Table A-69 O.J.T. monthly time report - Motor grader operator data inventory	89
Table A-70 O.J.T. monthly time report - Milling machine operator data inventory	90
Table A-71 O.J.T. monthly time report- Concrete paving finishing machine operator data inventory	91
Table A-72 O.J.T. monthly time report- Concrete paving machine/spreader operator data inventory	91
Table A-73 O.J.T. monthly time report - Deckhand data inventory	92
Table A-74 O.J.T. monthly time report - Mechanic data inventory	93
Table A-75 O.J.T. monthly time report - Truck driver data inventory	94
Table A-76 O.J.T. monthly time report - Tractor operator data inventory	94
Table A-77 O.J.T. monthly time report - Stone and aggregate spreader operator data inventory.....	95
Table A-78 Concrete design mix form data inventory	96
Table A-79 Density log book data inventory.....	97
Table A-80 Data dictionary of initially studied forms.....	100

LIST OF FIGURES

Figure	page
Figure 2-1 TransXML UML diagram sample	14
Figure 2-2 DIGGS top level hierarchy.....	15
Figure 2-3 DIGGS foundation group hierarchy.....	16
Figure 2-4 DIGGS data dictionary sample	17
Figure 3-1 Drilled shaft log.....	19
Figure 3-1 Continued	20
Figure 3-2 Updated data dictionary sample	21
Figure 4-1 Geotechnical database interface	32
Figure 4-2 Database login page	32
Figure 4-3 Admin interface.....	33
Figure 4-4 Project XML tree-general view.....	34
Figure 4-5 Project XML tree-employee specific	34
Figure 4-6 Project XML tree-wage poster view	35
Figure 4-7 Uploaded data in XML format.....	35
Figure 4-8 Uploaded data in HTML table format.....	36
Figure 4-9 Pile quantity download login screen	38
Figure 4-10 General XML tree view for an authorized user	38
Figure B-1 Original wage and hour record form	110
Figure B-2 Wage and hour record application interface.....	111
Figure B-3 Original piling quantities form-pay item reconciliation.....	112
Figure B-4 Original piling quantities form-invoice	113

1. INTRODUCTION

BACKGROUND AND PROJECT OBJECTIVES

The recent emergence of Extendable Markup Language (XML) offers a common data language for transferring data among software applications and users. The main advantage of using the technology is the fact that it does not require any specialized hardware or software and can be used in any platform provided they are XML compatible.

The technology has gained a lot of ground in construction industry and there have been a number of applications in different work areas which have been published in the literature. Some of the applications include aecXML for needs architects, engineers and contractors and LandXML for surveying and mapping. More recently, an FDOT sponsored initiative has undertaken the development of an XML standard for geotechnical data DIGGS (Data Interchange for Geotechnical and Environmental Specialists). This effort in the geotechnical area promises to become an international standard and has important participants that include the Environmental Protection Agency (EPA), the US Army Corps of Engineers, the US Geological Survey (USGS) and others.

Additionally, an NCHRP research project, *NCHRP 20-64 XML Schemas for Exchange of Transportation Data-TransXML*, has developed data standards for the transportation industry. The current TransXML development effort is limited to four operational areas:

- Survey/Road Design
- Transportation Construction/Materials
- Highway Bridge Structures
- Transportation Safety

Data definitions and schemas have been developed by the TransXML team for the selected operational areas. The TransXML development is a major step forward in providing a common data transfer standard for the transportation industry. However, an initial review of the TransXML product indicates that there are many operational areas within FDOT construction processes not covered by the TransXML standard. A comprehensive review of FDOT construction processes was necessary to identify specific data exchange needs and to determine the existence of applicable TransXML and/or DIGGS schemas. Where key data must be exchanged and schemas do not exist, schema development was undertaken. As one of the objectives of this project, a comprehensive review of the FDOT construction processes with regard to data exchange needs was performed. Further, existing TransXML data schemas were carefully examined and compared to FDOT construction data exchange requirements. This review focused on project as-built construction information and other related construction project information. Where schema standards did not exist for FDOT construction data exchange needs, the research team developed recommended schemas. Because data management efficiency directly affects FDOT's management ability to make informed decisions concerning its over 3 billion dollar work budget, there is an urgent need for the

development of this capability. The main objective of the research project was developing and integrating XML schemas within the FDOT data exchange processes and providing additional innovative procedures to handle the data exchange needs of FDOT. The overall objective was divided into the following tasks:

RESEARCH TASKS

1. Review of Data Exchange Needs

The research team conducted in-depth discussions with key FDOT personnel at the project, district and central Office levels. The objective was to develop an accurate assessment of current FDOT data usage with regard to the construction process. As a result the research team was able to identify the areas within the organization that needed innovative data management solutions. In order to complete the data needs analysis, a detailed data inventory was essential and was developed and used in later stages of the project. The research team followed the following benchmarks during the inventory development process;

- a) Commonly used labels
- b) Origin
- c) Current uses (reports, forms, software)
- d) Current storage provisions
- e) Mapping of the current construction project delivery with regard to data generation, usage and storage
- f) Assessment of FDOT Future Enterprise Data Needs for Construction

2. Review and Assessment of the Current standards

This task consisted of conducting a detailed review of the TransXML and DIGGS data standards. The focus was on identifying areas where XML coordination and additional development is needed, principally, for FDOT construction project data exchange.

3. Interim Report

The research team prepared and submitted an Interim Report summarizing the findings of tasks one and two.

4. Develop Proposed Data Schemas and Conflict Resolution Where Necessary

The research team reviewed the findings of tasks one and two with the FDOT management to determine where development of additional data schemas might be necessary. Needed schemas were developed by the research team. Detailed information on the schemas documentation can be found in following chapters.

5. Develop a FDOT Construction Data Exchange Protocol Website

The initial plan of developing a website to include the construction data exchange framework was realized by modifying the recently established website (Geotechnical database for FDOT, maintained by Civil and Coastal Engineering Department at the

University of Florida). The data dictionary and XML schema information made available in an easy to use format. This common information source should assist multiple FDOT data managers in coordinating construction data exchange issues.

6. Prepare and Submit Final Report

A comprehensive final report documenting the research effort and results was prepared and submitted for approval. This report included all information collected and developed on data structures.

7. Implementation

The geotechnical database for FDOT use has been used in the pilot studies and there is a website that enables users to interact with the database, which is also used for purposes of this project. A more detailed implementation plan including specific action items and a time table will be provided by the research team at the conclusion of the study. This implementation plan will address recommendations for the FDOT's integration of the XML standards within its construction processes.

2. RESEARCH METHODOLOGY

REVIEW OF DATA EXCHANGE NEEDS

The first task of the project was to review the FDOT data exchange needs by conducting a detailed data inventory analysis. A number of meetings were held with FDOT data management personnel at the project, district and central office level so that the researchers could familiarize themselves with FDOT construction data and determine what data needs to be exchanged. It was found that some of the data was not in electronic format preventing electronic storage and retrieval and the data that was stored electronically was not stored in a consistent manner. Some of the data in papers form was scanned and stored in a hard drive while some other data was stored using commercial software with questionable compatibility with other applications.

In order to develop a complete understanding of the FDOT construction data, it was essential to create a data inventory and then map the data to create a data dictionary. This was achieved by working with the forms available on the FDOT webpage that are available to the public at FDOT's website (<http://www.dot.state.fl.us>). These forms are the main means of data exchange between FDOT and the third parties.

A complete listing of all of the construction related forms can be found in appendices. The forms were downloaded and studied in detail but there were so too many forms to develop a data dictionary for all of them with efficiency. The urgency and relevancy of the forms varies. Some of the data on the forms are more important and exchanged more often than others so are more valuable for research. Further analysis allowed a reduction in the number of forms for consideration to a more reasonable number at this first stage. Then meetings were set to discuss the validity of the approach and future directions of the research with FDOT personnel. The proposed methodology was approved by the research coordinator.

To complete the first task researchers had to decide on which forms to work with first. Storage provisions, origin and target parties were used to determine the selection. Interviews and in-depth research was used to support this decision. The selected FDOT construction forms, their storage provisions, their origin and target party are all included in Tables 2-1, 2-2 and 2-3.

Table 2-1 Selected Construction Office Construction Forms

Form no	Form title	Producer	Consumer	Storage	XML standard recommendation	Justification
700-010-08	MOT review report	Contractor	DOT Construction	Project records, paper	Yes	Potential Value to FDOT Management
700-010-15	Work plan controlling item of work	Contractor	DOT Construction	Project records, paper	Yes	Potential Value to FDOT Management
700-010-25	Contractors past performance report	DOT Construction	DOT Construction	Project records and central Office, electronic	Yes	Potential Value to FDOT Management
700-010-64	Engineers maintenance of traffic evaluation at crash site	DOT Construction	DOT Construction	Project records, paper format	Yes	Potential Value to FDOT Management
700-010-69	Wage and hour record	Contractor	Contract Compliance Staff	Project records and district Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
700-010-84	Drilled shaft log	Construction Inspectors	DOT Construction, Project Administrator	Project records	Yes	Potential Value to FDOT Management
700-010-86	Drilled shaft rock excavation log	Construction Inspectors	DOT Construction, Project Administrator	Project records, paper	Yes	Potential Value to FDOT Management
700-010-89	Drilled shaft concrete placement log	Construction Inspectors	DOT Construction, Project Administrator	Project records, paper	Yes	Potential Value to FDOT Management
700-010-91	Drilled shaft construction & pay summary	Construction Inspectors	DOT Construction, Project Administrator	Project records, paper	Yes	Potential Value to FDOT Management
700-050-08	Piling tabulation	Construction Inspectors	DOT Construction, Project Administrator	Project records, paper	Yes	Potential Value to FDOT Management

Table 2-2 Selected Equal Employment Opportunity Office Construction Forms

Form no	Form title	Producer	Consumer	Storage	XML standard recommendation	Justification
275-020-04	O.J.T Monthly time report for asphalt luteman raker	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-07	On-the-job training conformity report	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-08	Trainee enrollment & notice of personnel action	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-09	O.J.T Monthly time report for concrete curb/sidewalk machine operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-13	O.J.T Monthly time report for erosion control specialist	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-17	O.J.T Monthly time report for earth wall erector	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-18	O.J.T Monthly time report for installer/tester antenna and transmission line	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-19	O.J.T Monthly time report for rough/finish roller	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-20	O.J.T Monthly time report for front loader operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-22	O.J.T Monthly time report	Contractor	Contract Compliance	District	Yes	Allow contractors and third

	for highway or bridge ironworker, reinforcing		Staff	Office, paper		party consultants to submit data electronically
275-020-23	O.J.T Monthly time report for scraper pan operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-24	O.J.T Monthly time report for form/curb & gutter builder (structures)	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-25	O.J.T Monthly time report for grade checker	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-26	O.J.T Monthly time report for asphalt/bridge deck screed operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-27	O.J.T Monthly time report for highway concrete finisher	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-29	O.J.T Monthly time report for highway/bridge carpenter	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-30	O.J.T Monthly time report for pipelayer	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-31	O.J.T Monthly time report for backhoe operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-35	O.J.T Monthly time report for painter, highway or bridge	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-36	O.J.T Monthly time report for air compressor operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third

						party consultants to submit data electronically
275-020-37	O.J.T Monthly time report for asphalt distributor operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-38	O.J.T Monthly time report for asphalt paving machine operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-39	O.J.T Monthly time report for asphalt plant drier operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-43	Certification of subcontract amount to db contractor	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-44	O.J.T Monthly time report for equipment mainten	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-45	O.J.T Monthly time report for motor grader operator motor grader operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-46	O.J.T Monthly time report for milling machine operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-47	O.J.T Monthly time report for concrete paving finishing machine operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-48	O.J.T Monthly time report for concrete paving machine/spreader operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-49	O.J.T Monthly time report for deckhand	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically

						party consultants to submit data electronically
275-020-51	O.J.T Monthly time report for mechanic (field service, truck or heavy equipment)	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-58	O.J.T Monthly time report for truck driver (this training)	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-60	O.J.T Monthly time report for tractor operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically
275-020-64	O.J.T Monthly time report for stone and aggregate spreader operator	Contractor	Contract Compliance Staff	District Office, paper	Yes	Allow contractors and third party consultants to submit data electronically

Table 2-3 Selected State Materials Office Construction Forms

Form no	Form title	Producer	Consumer	Storage	XML standard recommendation	Justification
675-010-03	Concrete design mix	Contractors, VT Inspector	DOT, Construction, Project Administrator	Project records, paper	Yes	Potential Value to FDOT Management
675-020-22	Density log book	Contractors, VT Inspector	DOT, Construction, Project Administrator	Project records, paper	Yes	Potential Value to FDOT Management

DATA DICTIONARY

A complete data dictionary is one of the most important elements in schema development process. This gives the programmer control over data to produce schemas consistent with data exchange requirements. A data dictionary is necessary to map an entire data set. First, a data inventory was created by parsing the element names, data types and document numbers to track the forms. This initial data inventory can be found in the appendices. With this knowledge of data elements, a framework could be created to continually develop the data dictionary. There are a number of alternative layouts in literature for developing a data dictionary. For the purposes of this research, the data dictionary was developed by using the recommendation of some TransXML and DIGGS (Details of these projects are provided in following chapters) project participants. A snapshot from the initial data dictionary is given in Table 2-4.

Table 2-4 Initial Data Dictionary Snapshot

Label on the form	Common name	Inventory name	Data type	Document	Producer	Consumer
-------------------	-------------	----------------	-----------	----------	----------	----------

"Label on the form" refers to the name of the data item on the form. This column is extracted directly from the forms. "Common name" is the name attributed to data items in order to prevent labeling conflicts. "Inventory" name is the heading used for the data items in research inventory specific to this project. "Common name" and the "Inventory name" are the same for most of the elements. "Data type" is the type of data, either simple or complex. "Document" is the form number from which the data is obtained. "Producer" is the party who created the data and "consumer" is the party that uses the data. These last two columns were created to be able to map the data by identifying the users of the data.

REVIEW OF CURRENT STANDARDS

Although there are a number of completed and on going XML schema development projects for various purposes, the research team was keen on focusing on two outstanding research initiatives; TransXML and DIGGS projects.

Review of TransXML Documentation

The TransXML project consists of four key business areas:

- Transportation construction/materials
- Transportation safety
- Highway bridge structures
- Survey/road design

Below is the detailed information about each business area.

- **Transportation construction/materials:** The major application files include Bid package, construction progress package, material sampling, testing package and project construction status.
- **Transportation safety:** Two application files were created. The first application allows users to search through crash records stored using the NHTSA FARS safety XML schema. Users may also link these crash records to related highway safety information using the “highway inventory safety analysis” (HISA) schema. The second application file demonstrates how multiple sources of crash data using different XML schemas can be combined in a single crash report.
- **Highway bridge structures:** Purpose of this section of the project is to enable the users of different bridge analysis software to exchange the input/output of their analysis. The developed software enables data interchange between XML compatible analysis programs.
- **Survey/Roadway design:** The purposes of this application are to demonstrate how to import and display GIS area features into a CAD design drawing. The application was developed on Microstation version 08.05.01.xx Windows x86 using MDL (Microstation Development Language). It will demonstrate how to use TransXML reference schema and the TransXML design project schema in different scenarios

Transportation construction/materials area of the TransXML project is the most closely aligned with the research scope of this study. Creating an XML interface to interchange data between different software is one of the long-term outcome objectives of the research project. However, that goal requires implementation efforts. Once the proper schema documentation is developed, it can be used in data base management and in creating data interchange platforms between different software applications and/or between software applications and the data base applications. The purpose of the research at this stage was to develop an algorithm to create schemas for data retrieved from forms or manuals and be able to interchange of the data seamlessly. Once this stage of the project was completed successfully, attention was directed to the other business areas. Below is the detailed analysis of the transportation construction/materials part of the TransXML project.

Bid Package Schema

The transportation agencies publish proposal bid packages for contractors so that they can prepare their bids. The third parties such as subcontractors, suppliers and others use this information to prepare their proposals. The TransXML research team used aecXML infrastructure project schema as a starting point because the areas to be covered in bid package schema included what is in aecXML schema and more. The bid package schema is to have additional data elements and will provide a more comprehensive solution than the aecXML schema. The bid package XML schema will enable the agencies to publish their bid packages electronically. The standard form of the published bid packages will then be loaded to automated bid preparation systems. The most

significant benefit can be observed when there are project changes after the publication of bid packages by agencies but prior to letting. In this case, many parties need to make modifications. Traditional paperwork based bid preparation would make this process long and costly. Once the above-proposed system is established, procedures at all levels of the project will be automated and changes after the bid hearing will not be as problematic.

Construction Progress Schema

Constant benchmarking of construction projects is a critical procedure. The size, cost and the value of the engineering structures makes it necessary to track construction progress to coordinate such things payments and receipt of supplies. For payments, daily construction progress is recorded for pay items at the project site. This information is then given to the project engineer to prepare a progress estimate which will start the payment procedure in the central Office. Like the bid package schema, the construction progress schema will be built upon the aecXML infrastructure project schema. The schema is designed to streamline the data flow and reduce the possible errors. Because the data included in the payment progress report varies in size and type, an automated system would help prepare it more efficiently.

Design Project Schema

This schema includes design information for the projects, ID, unit system, federal work type etc. Together with the TransXML reference schema, the Design Project schema can be used to upload a TransXML master pay item list, create a pay item list in order to provide information about the project.

Linear Reference Schema

This comparatively small-sized schema would be included in larger schemas such as the Bid Package Schema or Construction Progress Schema. Its purpose is to provide data type definitions to complete the packages.

Material Sampling and Testing Schema

The pay item quantity information is gathered at sites for progress payment information. Other components of the pay items data are studied and tested to determine whether the materials used meet the agencies' material requirements. The results of the tests are conveyed to the project engineer who is responsible for the progress reports sent to the central Office to start the payment process. Like the previous main schemas, the material sampling and testing schema is built on the aecXML infrastructure project schema. The material sampling requires a wide variety of data to be exchanged among numerous parties. In addition, a variety of methods are used to gather that information and this variation in the process can easily introduce errors. The schema proposed is to provide a streamlined, seamless method of sharing the information that will eventually eliminate all user related errors and accelerate the procedure.

Project Construction Status Schema

Project participants from different levels of the project hierarchy need to use the construction status information. The Project Construction Status Schema will address this issue. Along with the other three main schemas, it will be built upon the aecXML Infrastructure Project schema. The schema is proposed to provide a common way to publish the project construction status to various participants. It will represent the construction status in different formats to target specific audiences yet be transparent and global for the all project participants.

Reference Schema

This is another example of small sized schemas that is included within larger ones to provide data type definitions. It includes common data type definitions that can be used in multiple schemas.

TransXML Base Schema

This is another small-sized schema included within a larger one to provide data type definitions. As the name implies it is the base schema for the TransXML project. It includes basic data types such as contract ID, address type definitions and units of measurement for various larger-sized schemas.

The most important application schemas created in the TransXML are the four largest ones: bid package schema, construction progress schema, material sampling and testing schema, and project construction status schema. The TransXML documentation includes these schemas the application files for these four, the XSL style sheets used to convert the XML application files to HTML files and the resultant 4 HTML tables created from these 4 schemas.

TransXML UML Diagrams

The unified modeling language (UML) diagrams use interconnecting boxes to define the data element definition types and their relationships with each other. Figure 2-1 depicts the TransXML Bid Package Overview UML diagram.

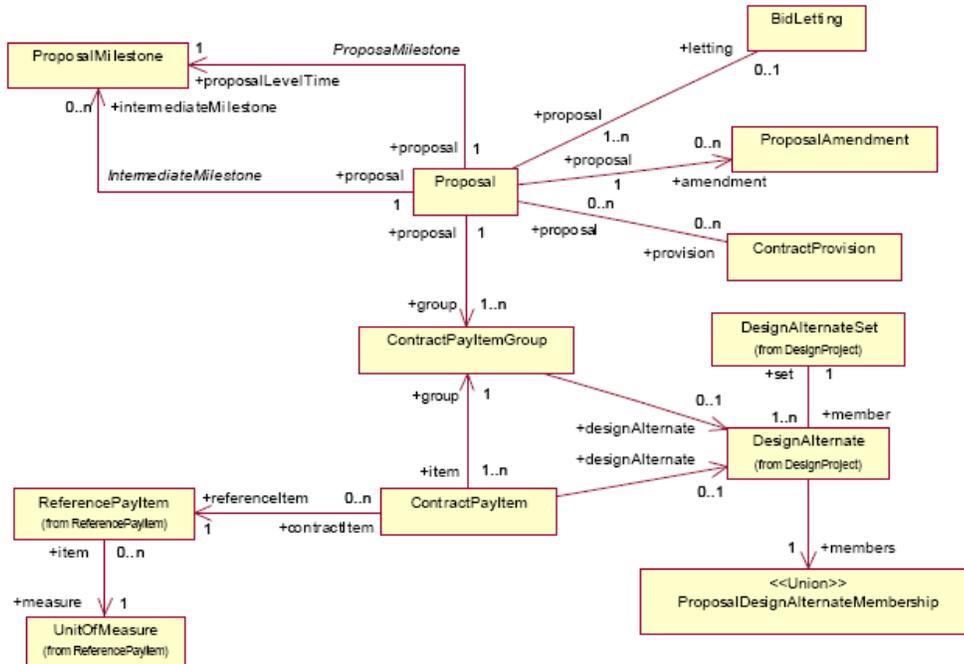


Figure 2-1 TransXML UML diagram sample

Review of the Current DIGGS Standards

The DIGGS project was not at a stage to be considered as an important candidate to make contribution to this research project at the earlier days of the project. However, with the international input and continuous effort to collaborate the DIGGS project has evolved into one of the most prolific efforts as to become an international standard for geotechnical data interchange. Just as with TransXML, a similar effort was given to understanding and analyzing the DIGGS system.

The approach followed during development of schemas for DIGGS was different from that of TransXML. In TransXML a few key business areas were determined and some components within each area were selected. The DIGGS documentation is strictly limited to inputting geotechnical data that can be output in a comprehensive set of international and standards. The DIGGS schemas are developed to address all the geotechnical data exchange requirements of any type of construction. The international DIGGS committee will modify standards to meet international needs.

The DIGGS standards follow a top-down hierarchy. The committee of geotechnical experts prepared a data dictionary and developed the hierarchy as they thought it would be most useful. Figure 2-2 shows the top level DIGGS project hierarchy.

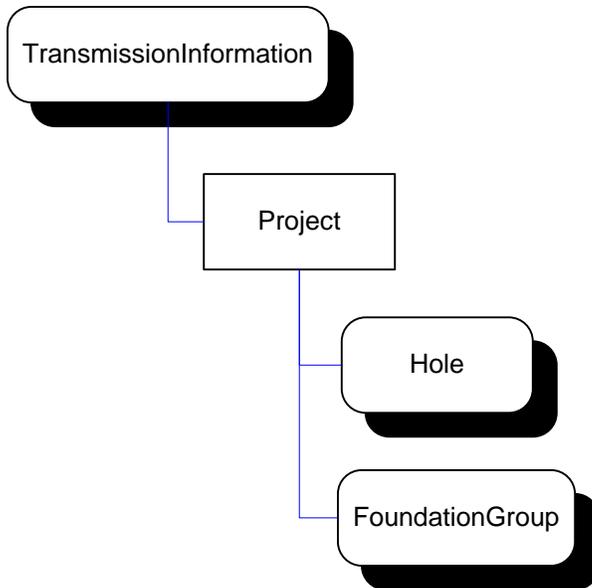


Figure 2-2 DIGGS top level hierarchy

Every data group has a parent-child-element relationship with the group above or below it. The Transmission Information group can have an infinite number of projects attributed to it and each project can have an infinite number of Holes and Foundation Groups.

Every data entry has a project ID attribute to identify the project it is derived from. The hole type contains information about the layers, data samples, laboratory tests, etc. Once a project is selected, the related soil analysis information is depicted with hole data group attributes. The project may include piles that are driven or cast in place. Any piling related data is included in foundation group schemas.

Figure 2-3 presents the details of the foundation group hierarchy. The foundation group is composed of two main sections; driven pile and cast shaft. As the name implies, driven pile part includes the details of driven pile construction, analysis, structure. Similarly, cast shaft includes the information about cast in place shaft construction. Each shaft can have as many cast shaft components as needed attributed to it. The foundation group type schema includes more general; geometry, bridge number, pier name information, as well as more specific information about driven pile and cast shaft components.

The cast shaft component has child elements attached to it. The cast shaft type schema includes element ID, description, name and instance. The element instance is referred to as a cast shaft instance and it can appear in the schema multiple times. It can be thought as a snapshot of a single shaft with the properties of the shaft attached to it. Allowing multiple occurrences enables the users to record as many shafts as needed for any project. The relation between the cast shaft and cast shaft instance is shown in Figure 2-3. Similar to the cast shaft and cast shaft instance relationship, the cast shaft instance has child elements cast shaft construction, capacity, load test, load. The same top-down hierarchy is followed throughout the whole schema development process. This

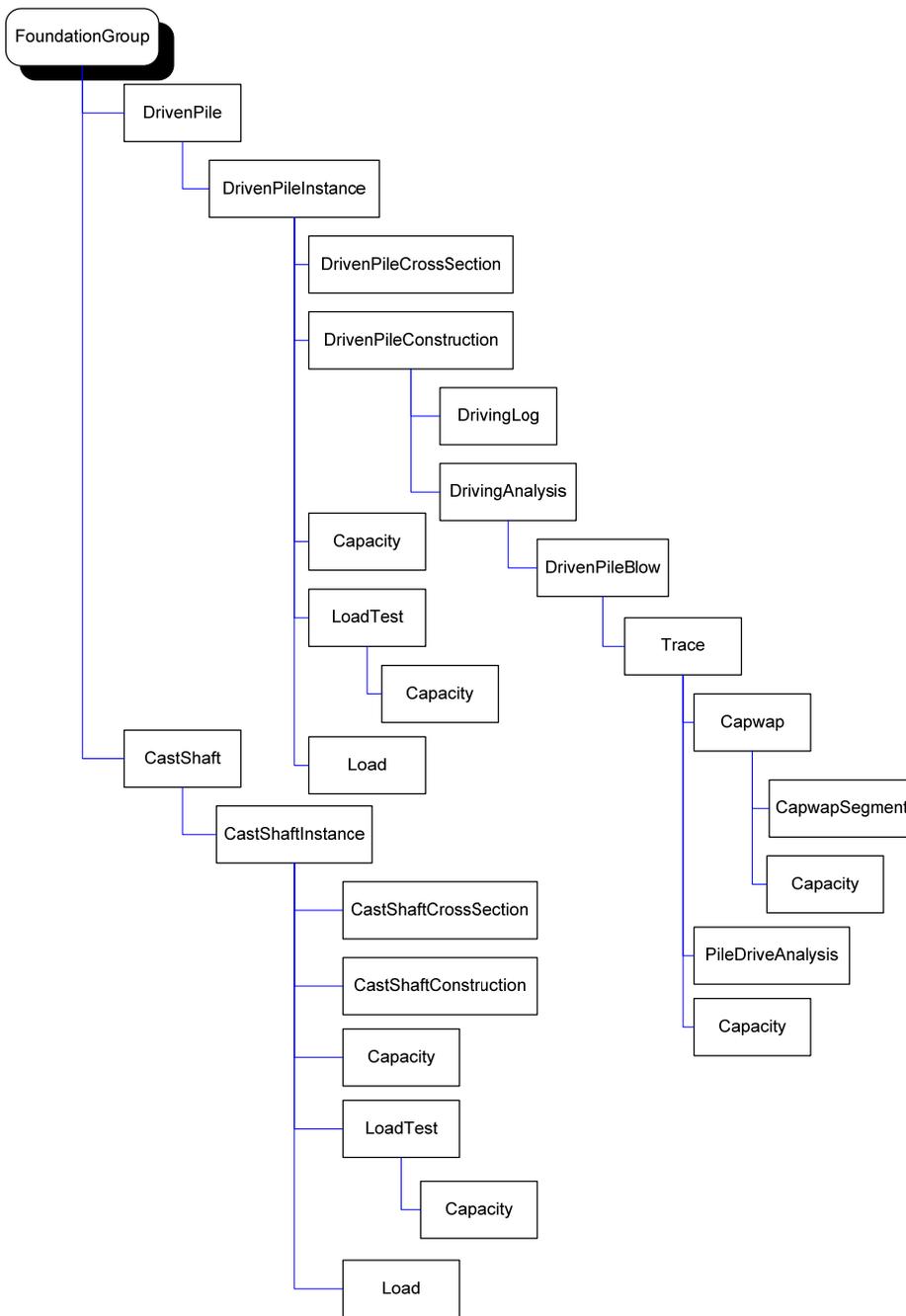


Figure 2-3 DIGGS foundation group hierarchy

approach makes it easier to develop the data dictionaries and modifications to the existing schemas as the data is properly structured and the schema sizes are relatively small.

DIGGS Data Dictionary

Different from TransXML, the DIGGS project uses a data dictionary in table format to handle the needs of data interrelationships and their types for schema development. Figure 2-4 is a snapshot from the DIGGS data dictionary of the cast shaft component.

8.90 CastShaftInstanceType

Data concerning a specific instance of a cast shaft

Extends gml:AbstractFeatureType

Property	Definition	Type	Example	Occurrences
gml:id	A globally unique identifier. Generated with an algorithm, do not generate by hand.	UUID	f0164a30-8dc4-11da-a72b-0800200c9a66	0..1
gml:description	Object description	string		0..1
gml:name	Object name.	string		0..*
type	This is the state of the foundation element being described. Constructed, Design, etc.	gml:CodeType	Constructed	1..1
roles	People or businesses associated with this instance	diggs:RoleType		0..*

Figure 2-4 DIGGS data dictionary sample

FINDINGS

- The FDOT management of construction related data is not at the level of the current technology.
- XML technology can be effectively employed to overcome some of these problems as it provides easy to implement and effective solutions to the data exchange requirements.
- TransXML and DIGGS projects can provide benchmarks as to design the schemas but the schemas developed in these projects may not be convergent with the needs of FDOT. Thus, large scale collaboration may not be possible without additional development.
- The research team and TransXML and DIGGS participants can collaborate for mutual benefit of each party in schema standard development process.

3. NECESSARY SCHEMA DEVELOPMENT

SCHEMA DEVELOPMENT PROCESS

The next step in the project framework was the schema development stage. After reducing the initial number of forms to a reasonable number to work with, research committee meetings were held to decide which forms would be used to start with; the trial schema development process was initiated. The purpose of this initial step was to assess the effort needed to create an actual schema and to observe the possible changes to the initial data dictionary. The construction data from the following forms was chosen as a starting point: 700-010-84-drilled shaft log, 700-010-86-drilled shaft rock excavation log, 700-010-89-drilled shaft concrete placement log, 700-010-9-drilled shaft construction & pay summary and 700-050-08-piling tabulation. Among those, the drilled shaft log was selected to be used as an example in the trial process. The form can be seen in Figure 4.1

Drilled Shaft Log Schema Development

Drilled shaft log form includes detailed information about the drilling process and details of cast shaft construction. The first section of this form consists of administrative information about the project, such as project name, contractor etc. This part is similar in most of the FDOT construction forms, regardless of the Office producing them.

The first stage of the trial procedure was updating the data inventory of the selected form and to create a data dictionary with the updated inventory in order to provide the research team with the technical details (Data fields and their interrelations are included in the dictionary) needed for schema development. The initial data inventory was not completely in agreement with the technical details of the work operation. One of the most apparent problems revealed in the review, was the graphical data items in the data inventory. The databases can only store information in plain text format. Although the XHTML application files can be modified to represent graphics they are not a part of the schemas. Once the data inventory was updated accordingly, the data dictionary was updated to better address the needs of schema development process. Figure 3-2 depicts the final version of the data dictionary format.

Note that the data dictionary contains the schema group and data group “tags” which is not a part of drilled shaft log form. The tags schema includes data elements that are common for most of the forms; financial project ID, contract number. Instead of redefining these common elements for each schema, a general schema named tags was created and used as a part of other schemas.

The differences between this version and the older version of the data dictionary resulted from continuously changing needs of the research. The schema group is referred to as the major schema component, including smaller schemas and/or data groups which are represented under the data group. Data groups are referred to as complex data elements that are defined either in different schemas or within the schema group. The inventory name was deleted because it was determined to be unnecessary. The element name is replaced with the common name. A definition group was added to make the dictionary easier to comprehend. Similarly, an example was added to give an example of

0..unbounded, optional may not or may occur infinitely many times, 1..unbounded, must occur at least once and can take place infinitely many times.)

Schema Group	Data Group	Label on the Form	Element name	Document	Definition	Example	Unit Type	Data Type
tags	tags			700-010-84 700-010-86 700-010-89 700-010-91	Tags that are used to identify the data			fdot:DefinitionTagsType
tags	tags	Project Name	projectName	700-010-84 700-010-86 700-010-89 700-010-91	Name of the project	Bridge construction	NA	string
tags	tags	FIN Project No.	FINProjectNo	700-010-84 700-010-86 700-010-89 700-010-91	Financial project number	ab12345cd	NA	string
tags	tags	Contractor	contractor	700-010-84 700-010-86 700-010-89 700-010-91	Name of the contractor	John Doe	NA	string
tags	tags	Inspected By	inspectedBy	700-010-84 700-010-86 700-010-89 700-010-91	Name of the inspector	John Doe	NA	string
tags	tags	Date	date	700-010-84 700-010-86 700-010-89 700-010-91	Date of the inspection	10-10-1999	NA	date
tags	tags	Approved By	approvedBy	700-010-84 700-010-86 700-010-89 700-010-91	Name of the approver	John Doe	NA	string
tags	tags	Date	date	700-010-84 700-010-86 700-010-89 700-010-91	Date of approval	10-10-1998	NA	date

Figure 3-2 Updated data dictionary sample

The data dictionary has proven to be useful in schema development process; however, as the researchers gained more experience, the necessity of having a data dictionary became redundant. With better understanding of the data on the forms, the data inventories created was enough to successfully complete the schemas. The data inventory of the forms can be found in appendices.

The DIGGS template was followed for new schemas as it is easier to comprehend and update than that of TransXML and other documentations in literature. In addition, data dictionaries are easier to follow and update than the UML diagrams. Since everything in the development stage will require possible modifications or updates it is important to have clear documentation to implement modifications. The later stages may require further development of UML diagrams but it will be more convenient to do so with a complete data dictionary. The complete data dictionary of the drilled shaft log is included in the appendices.

The Drilled Shaft Log schema is also given in appendices. A sample of the tags schema documentation is presented as follows:

```
<?xml version="1.0" encoding="UTF-8"?>
<schema xmlns:fdot="http://www.dot.state.fl.us/"
xmlns="http://www.w3.org/2001/XMLSchema"
xmlns:gml="http://www.opengis.net/gml"
targetNamespace="http://www.dot.state.fl.us/">
<import namespace="http://www.opengis.net/gml"
schemaLocation="gml/3.1.1/base/feature.xsd"/>
<complexType name="DefinitionTagsType">
<annotation>
<documentation>
</documentation>
</annotation>
<sequence>
<element name="projectName" type="string" minOccurs="1" maxOccurs="1">
<annotation>
<documentation>
</documentation>
</annotation>
</element>
<element name="FINProjectNumber" type="string" minOccurs="1" maxOccurs="1">
<annotation>
<documentation>
</documentation>
</annotation>
</element>
<element name="FAPNumber" type="string" minOccurs="0" maxOccurs="1">
<annotation>
<documentation>
</documentation>
</annotation>
</element>
<element name="county" type="string" minOccurs="0" maxOccurs="1">
<annotation>
<documentation>
</documentation>
</annotation>
```

```
</element>
<element name="district" type="string" minOccurs="0" maxOccurs="1">
  <annotation>
  <documentation>
  </documentation>
  </annotation>
</element>
<element name="payItemNumber" type="string" minOccurs="0" maxOccurs="1">
  <annotation>
  <documentation>
  </documentation>
  </annotation>
</element>
<element name="contractor" type="string" minOccurs="1" maxOccurs="1">
  <annotation>
  <documentation>
  </documentation>
  </annotation>
</element>
<element name="inspectedBy" type="string" minOccurs="0" maxOccurs="1">
  <annotation>
  <documentation>
  </documentation>
  </annotation>
</element>
<element name="inspectionDate" type="date" minOccurs="0" maxOccurs="1">
  <annotation>
  <documentation>
  </documentation>
  </annotation>
</element>
<element name="approvedBy" type="string" minOccurs="0" maxOccurs="1">
  <annotation>
  <documentation>
  </documentation>
  </annotation>
</element>
<element name="approvalDate" type="date" minOccurs="0" maxOccurs="1">
  <annotation>
  <documentation>
  </documentation>
  </annotation>
</element>
<element name="page" type="integer" minOccurs="0" maxOccurs="1">
  <annotation>
  <documentation>
```

```

</documentation>
</annotation>
</element>
<element name="pierNo" type="string" minOccurs="0" maxOccurs="1">
<annotation>
<documentation>
</documentation>
</annotation>
</element>
<element name="shaftNo" type="string" minOccurs="0" maxOccurs="1">
<annotation>
<documentation>
</documentation>
</annotation>
</element>
<element name="station" type="string" minOccurs="0" maxOccurs="1">
<annotation>
<documentation>
</documentation>
</annotation>
</element>
<element name="offset" type="gml:MeasureType" minOccurs="0" maxOccurs="1">
<annotation>
<documentation>
</documentation>
</annotation>
</element>
</sequence>
</complexType>
</schema>

```

The first data group after the tags is the optional casing information. This information may or may not be a part of the schema, depending on the type of shaft to be represented in the schema. The drilled shaft log schema uses a complex type called drilling increment to describe the incremental soil profile analysis performed to determine soil type underneath. The reasons to include the data in the drilling increment complex type under drilled shaft log complex data type was to force the child elements (the increments) be in sequential order as the actual analysis of the soil layer is done the same way. The soil sampling is done in layers on top of each other. The soil auger diameter originally was in the dimensions section of the construction form but was included in the drilling increment complex type in order to describe the continuous flight auger drilling with corresponding depth, time, elevation, and soil description information. Then the time information (different from the time information included in drilling increment) is included in the drilled shaft log schema.

Within the drilled shaft log schema, a complex structure is used to include the reference elevation, ground surface elevation, water table elevation, cutoff elevation and

tip elevation. The complex data type is used to keep the same relation for the elevations as in the form itself. In the form, the elevations data group is composed of five elevation values so the schema needs to also have five fields.

Similar to the elevations data group, the dimensions were introduced as a complex type. The child elements are:

- embedded length,
- the length of the shaft driven underground,
- rock socket length,
- the length of the shaft embedded into the rock, (The soil auger diameter was used in the drilling log schema in case of continuous flight auger diameter usage),
- diameter of rock socket (diameter of the shaft in rock),
- diameter of overburden shaft (diameter of the shaft above surface),
- overburden shaft length (length of the shaft above surface),
- constructed shaft length, which is the total length of the shaft (Also equals to the summation of the overburden shaft length and embedded shaft length).

The drilling mud section in the form describes a drilling method used for cast shaft construction only. Therefore, it is not included in drilling log schema developed. The drilling log schema is designed to be used in different work areas. Therefore, it will include general data items, not specific to a certain task. Another schema will address the more specific information about the cast shaft construction. The schema is called “drilled cast shaft construction details” and it includes information strictly limited to drilled cast shaft construction. The data is obtained from the following data groups in the construction form 700-010-84: drilling mud, detailed information about drilling mud; clean out-method and time information about the bottom clean out; and shaft bottom check-details of final shaft bottom inspection.

The graphical portion of the form, where the average depth of the finished shaft is calculated by taking measurements from five different locations at the bottom of the shaft, is not included as it would be hard to comprehend without the graphical figure. However, the average shaft bottom elevation is included.

The final part of the form was the rebar cage check list. Similar to other data groups on the form, it was introduced as a complex data type and the elements of the data group were introduced as its child elements. These include; proper number of vertical bars, proper number of horizontal bars, side standoffs, epoxy conditions and ties and connections all of which Boolean data type.

Complete List of Created Schemas

After developing the initially selected schemas, the research team extended the schema development to the forms that required schema development. These forms are listed below:

1. Concrete Placement Log
2. Contractor Past Performance Rating
3. Compressive Strength of Concrete Cylinders
4. Concrete Mix Design
5. Density Log Book
6. Drilled Shaft Construction and Pay Summary
7. Drilled Shaft Log
8. Rock Excavation Log
9. Trainee Enrollment and Notice of Personnel Action
10. Wage and Hour Report
11. Work Controlling Item of Work
12. MOT Evaluation at Site
13. O.J.T. Monthly Time Report-Air Compressor Operator
14. O.J.T. Monthly Time Report-Asphalt Deck Screed Operator
15. O.J.T. Monthly Time Report-Asphalt Distributor Operator
16. O.J.T. Monthly Time Report-Asphalt Paving Machine Operator
17. O.J.T. Monthly Time Report-Asphalt Plant Drier Operator
18. O.J.T. Monthly Time Report-Asphalt Luteman Raker
19. O.J.T. Monthly Time Report-Backhoe Operator
20. O.J.T. Monthly Time Report-Bridge Carpenter
21. O.J.T. Monthly Time Report-Concrete Curb Sidewalk Machine Operator
22. O.J.T. Monthly Time Report-Paving Finishing Machine Operator
23. O.J.T. Monthly Time Report-Paving Machine Spreader Operator
24. O.J.T. Monthly Time Report-Curb Builder
25. O.J.T. Monthly Time Report-Deckhand
26. O.J.T. Monthly Time Report-Earth Wall Erector
27. O.J.T. Monthly Time Report-Equipment Maintenance Technician
28. O.J.T. Monthly Time Report-Erosion Control Specialist
29. O.J.T. Monthly Time Report-Finish Roller Operator
30. O.J.T. Monthly Time Report-Grade Checker
31. O.J.T. Monthly Time Report-Highway Carpenter
32. O.J.T. Monthly Time Report-Highway Concrete Finisher
33. O.J.T. Monthly Time Report-Highway Worker
34. O.J.T. Monthly Time Report-Installer
35. O.J.T. Monthly Time Report-Small/Large Fronted Loader Operator
36. O.J.T. Monthly Time Report-Mechanic
37. O.J.T. Monthly Time Report-Milling Machine Operator
38. O.J.T. Monthly Time Report-Motor Grader Operator
39. O.J.T. Monthly Time Report-Painter
40. O.J.T. Monthly Time Report-Pipelayer
41. O.J.T. Monthly Time Report-Rough Roller Operator
42. O.J.T. Monthly Time Report-Scraper Pan Operator

43. O.J.T. Monthly Time Report-Stone and Aggregate Spreader Operator
44. O.J.T. Monthly Time Report-Tractor Operator
45. O.J.T. Monthly Time Report-Truck Driver
46. O.J.T. Conformity Report

The complete detail of these schemas is included in Appendix C.

Synergies with TransXML and DIGGS

As previously discussed in detail, the two major XML standard development projects are TransXML and DIGGS projects. Both of the projects have been completed and the final reports and the final documentation for both of the projects were published. The TransXML project participants and documentation was of significant help at the initial stages of this research project. However, domain of the documentation of the TransXML project and that of the forms chosen in this project are different. In addition, the TransXML project aimed at utilizing schemas that are already in the literature, i.e. aecXML. Although the approach is efficient in terms of reducing the efforts required to develop the schemas, it reduces the flexibility of the schemas to fit the needs of the users better. The approach in this project was to develop the schemas by using what is used by FDOT right now. The main reasons for doing so was to make sure the created schemas were fit for FDOT data and to reduce the user resistance to the change by enabling them to be able to use the same data labels on the forms for the electronic data transactions. The collaboration with the TransXML project, therefore, was at rather technical, data-specific level and a higher level of collaboration was not possible. In addition, the construction/materials area of the TransXML project has only produced four schemas.

On the other hand, the DIGGS project has been an attempt to create a global standard for geotechnical data. As the aim is to be the international standard, the existing documentation did not play a significant role in schema development process for this study. The documentation of the DIGGS project includes around 200 schemas, some example XML application files, and a comprehensive data dictionary. The structure of the DIGGS schemas was used as a benchmark for this research because it was easy to parse, read and update. Although, the DIGGS project is an attempt to have a comprehensive data standard for geotechnical data, the documentation did not include the drilled pile related schemas. The missing drilled shaft related schema was developed for the DIGGS standard in this study.

FINDINGS

- Schema development is the most important aspect of the XML utilization procedure. Once the schema development is completed, the remaining activity will be relatively simple programming procedures.
- Provided the institution is willing to invest in database management, the databases compliant with the schema documentation developed in this project can be created or the existing schemas can be converted to be compatible with the structure developed in the schemas.

- With databases compatible with the schemas structure, every party doing business with FDOT can exchange information provided they have an access to the schema documentation.
- Although the schemas can be used as mentioned above, standalone applications of XML can be efficiently used for data exchange operations in addition to traditional uses of XML.

4. DEVELOPMENT OF SUPPORTING DATA MANAGEMENT APPLICATIONS

WAGE AND HOUR RECORD APPLICATION

Background

The wage and hour record form is used by parties doing business with FDOT to record and inform the agency about the wage information of the employees working on the projects carried out for FDOT. Similar to other forms, it is available on FDOT's website and a copy of the actual form and the final application file outline can be found in appendices. The spreadsheet application development was not in the scope of the initial project proposal; however, the project coordinator brought to the attention of the research team that there was a need for a standalone application to help third parties in exchanging the wage information with FDOT. The idea behind the application is to have a data sharing platform that will enable the third parties to upload the related wage information of their workers to an FDOT database directly from their computers without requiring them to invest in any hardware or software. Of all the alternative platforms for a standalone application, the research team concluded a Microsoft Excel spreadsheet application is the best alternative for the following reasons:

- The program has in-built XML compatibility, users can import/export XML file
- It is readily available almost all work computers
- Formulas can be used in excel spreadsheets and they are more stable than HTML table as XML application platforms
- Data entry abilities of the users can be restricted depending on the requirements of the exchange that can prevent erroneous data entries.
- The completed application file is very similar to the original wage and hour record FDOT publishes which should reduce the possible user resistance to the application.

Although, Microsoft Excel has in-built XML compatibility, the XML files it exports are not structured and in order to have structured XML files a visual basic application language algorithm was developed (Excel spreadsheets are scripted in VBA). The developed wage and hour schema was used as a benchmark while structuring the XML output for the wage and hour record spreadsheet application.

The database used in the process was the FDOT geotechnical database created and maintained by the University of Florida Civil and Coastal Engineering Department, which can be accessed at <http://fdot.ce.ufl.edu>. The application file enables the authorized users to upload the wage information to the geotechnical database by using the provided software and later on view the uploaded data using an internet browser. The same capability is provided for the officials that are to review and approve the submissions. They can login to the database by using simple internet connection and a web browser.

The platform developed enables the users to make changes to data when it is in the database. Below are the steps to set up and use the wage and hour record spreadsheet application file to upload data to the designated database and navigating through the website once the data is in place.

Developing the Application Platform

- Obtain the wage and hour record spreadsheet application file that will be published in projects website
- Download the installation file that will enable the data exchange with the data base from <http://fdot.ce.ufl.edu/applications.html> (dll_version2.zip), which can also be found in appendices
- Unzip the downloaded file and install the software
- Obtain required authorized user names and passwords; send an e-mail to duzgun@ufl.edu from the intended party's e-mail address and request a user name and project role (The system generates the user names and passwords automatically and sends that information to the email address provided). Research team will provide user names and passwords to associates who will be testing the system

Entering Data and Submitting Wage and Hour Record From

On the form, only white cells are to be filled by the users. The grey ones are locked, so no change can be made to those. Similar to grey cells, the green cells are also not changeable; however, they include formulas and they will be filled automatically. This is the main difference with the grey cells.

Entering Data on the Form

Part I

1. Contractor's Name: Put name of the contractor/subcontractor.
2. Address: Put the address in to the provided space
3. Payroll Number: Put the unique payroll number assigned to the submittal.
4. For the Week Ending: The week ending day is assigned to be the Saturday. Thus, the contractor should put the date in dd/mm/yy format in to this cell.
5. Contract #: Put the contract number given to the project by FDOT.
6. FIN #: Put the financial project number assigned to project.

Part II

a. Employee Identification

1. EmployeeID: This is a significant unique parameter as the individuals' wage information will be attached to this number in the data base. The actual wage and hour record does not include this element. There was a need for such a variable, SSN can be a substitute; however, due to security concerns, it is more convenient and easy to assign a unique ID, which should be decided by both decided- Contractor and FDOT officials. Consistency is required.

2. Address: Put employee address in designated cell.
3. Name: Put employee name.

Notice that of all the variables in the employee identification part, the EmployeeID is the only unique one and is crucial for the database functioning.

b. Exemption/Race/Gender

1. No. Exemptions: Put the number of exemptions in the designated cell.
2. Race: Select the race of employee from the drop down menu.
3. Gender: Select the gender of employee from the drop down menu.

c. Work Classification

1. Work Classification: Put the work classification from FDOT classification list to the designated cell.

d. Date

1. The date ending date was designated to be Saturday. Once the date referring to the week ending Saturday inserted, the rest of the days and the dates will be automatically filled.
2. O and S are referred to as overtime and standard hours worked. These are to be put in the required cells accordingly.

e. Total Hours

1. Total Hours cell will be filled automatically depending on the values inserted in overtime and standard time hours.

f. Pay Rate

1. Pay rates of standard and overtime work hours are to be inserted accordingly to the designated cells.

g. Project Gross/Weekly Gross

1. Project/Weekly gross for will be calculated by multiplying the pay rate with the total hours.

h. Deductions

1. FICA: Put the total FICA deductions in to the designated cell.
2. Withholding tax: Put the total withholding tax in to the designated cell.
3. Total from attached deduction sheet: The total amount of deduction from summed from the deduction sheet which is in the tab next to the spreadsheet currently being used.
4. Total deductions: The summation of the three deductions mentioned above. A formula is generated to sum the three, so no calculation or input is required.

i. Net Wages Paid for Week

1. Net wages paid for week is the difference of project/weekly gross and the total

deductions and again a formula is generated to calculate this. No input or calculation is required.

Once the spreadsheet completed the user can upload his data to the designated database by clicking on the “Upload to Database” button on top of the spreadsheet. Once the link is clicked on a screen will appear asking the user name and after that another one will be asking the password associated with that user name. The user name and the passwords will be provided by the project research team.

Navigating through Database

1. Go to <http://fdot.ce.ufl.edu> and click on ***Admin Interface*** link

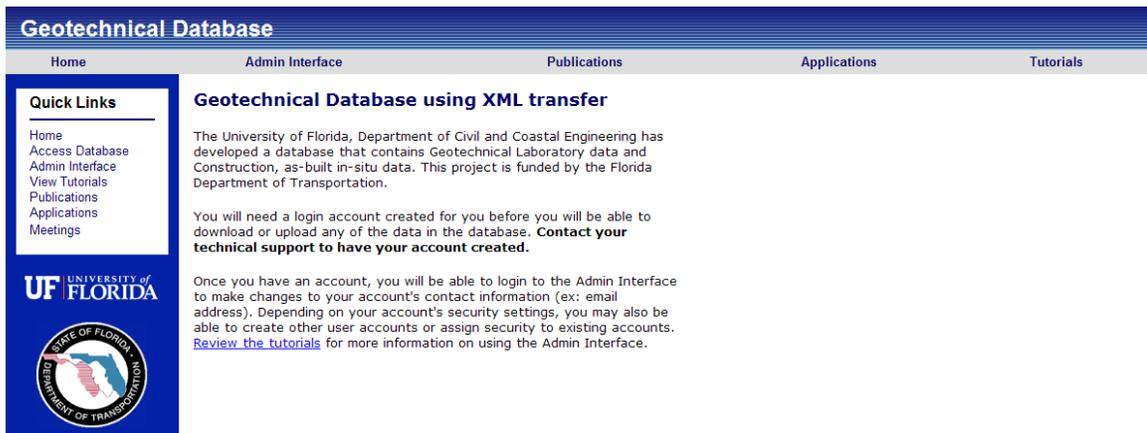


Figure 4-1 Geotechnical database interface

2. Enter appropriate Username and Password to access the interface.

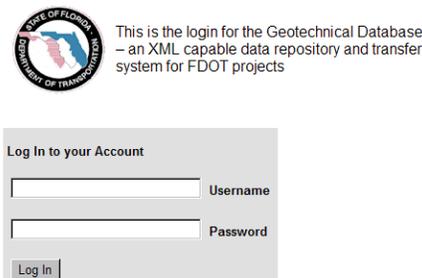


Figure 4-2 Database login page

3. Once logged in the user will have the following options:

- Modify My Account
- View Account Access
- View My XML Tree
- Request Access Interface
- Assign Users to Existing Projects
- Create New User
- Modify Existing User

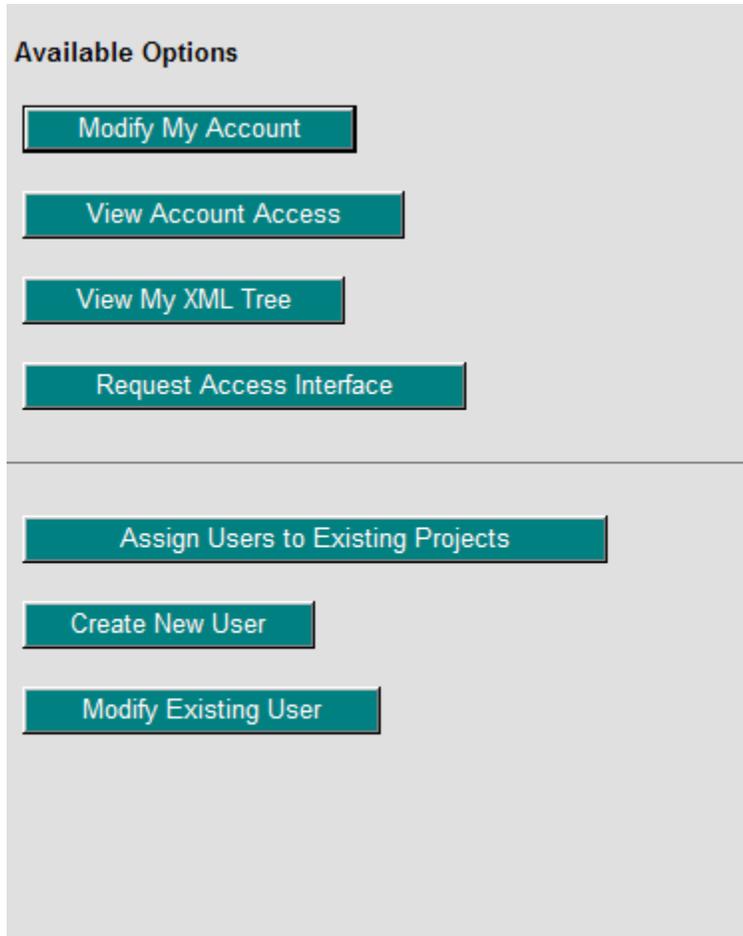


Figure 4-3 Admin interface

The last three options are not available to regular users. In wage and hour record case, the parties that are uploading the data will not have access to the last three; however, the approving party will have access to these options. The user hierarchy will be set up by the research team upon creating the initial user names etc.

Modify My Account: Users can change their information, e-mail, password etc.

View Account Access: The user hierarchy can be checked here (wage_poster/wage_approver).

View My XML Tree: There are three types of available results; XML Results, Table Results and Excel File Results. As the names imply the data uploaded by users to a specific project can be viewed in three different formats.

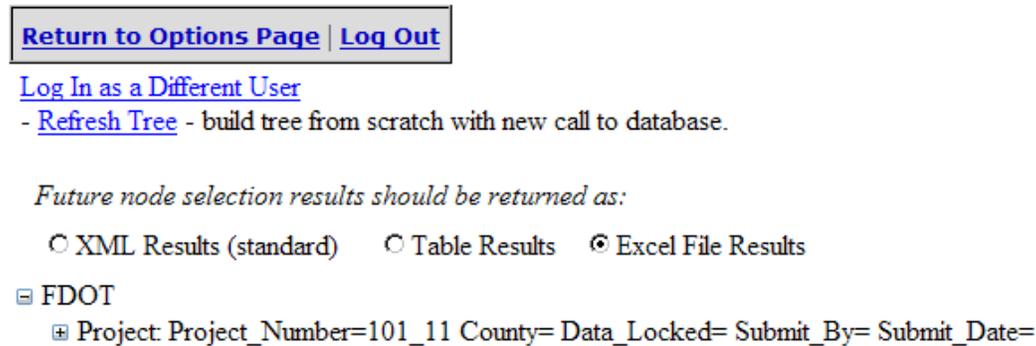


Figure 4-4 Project XML tree-general view

As can be seen, all results are available and to view a specific one the box next to the result description is to be checked. The database stores project data under a specific project number. In the above screen shot it is project number 101_11.

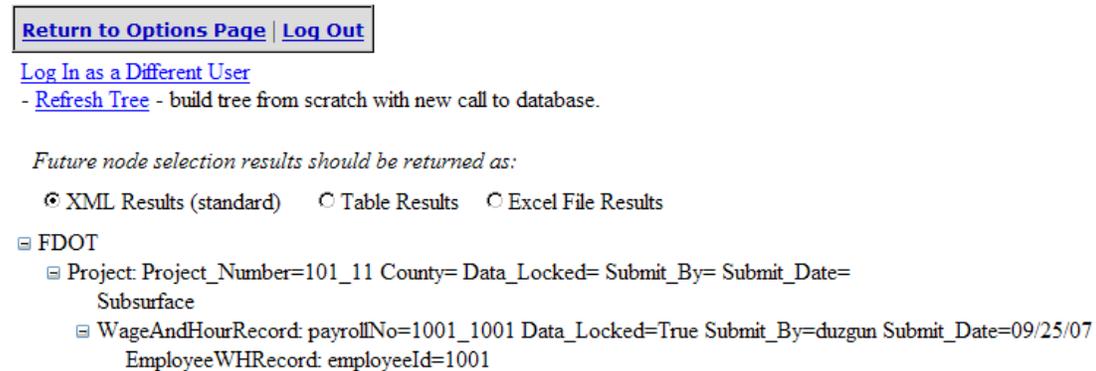


Figure 4-5 Project XML tree-employee specific

Once the user clicks on the “+” sign on the left of the project number, the name of the uploaded data, the submitter, submission date and the corresponding employeeId can be seen. In order to be able to see the table, first user needs to select the output format and should click on the name of the uploaded data set.

[Return to Options Page](#) | [Log Out](#)

[Log In as a Different User](#)

XML File Saved - [Your XML File](#)

- [Refresh Tree](#) - build tree from scratch with new call to database.

Future node selection results should be returned as:

XML Results (standard) Table Results Excel File Results

FDOT

Project: Project_Number=101_11 County= Data_Locked= Submit_By= Submit_Date=

Figure 4-6 Project XML tree-wage poster view

As can be seen above there is an additional link than the previous screen shot, **Your XML File**.

```
<?xml version="1.0" encoding="utf-8" ?>
<GML>
- <Project Project_Number="101_11" Name="" Base_Latitude="" Base_Longitude="" Base_Station="" Base_Offset="" Comment="" Financial_Number="" County="" Description=""
  Contract_No="" ReportFriendly_FileName="" ReportGUID_FileName="" ReportFileName="" Data_Locked="" Submit_By="" Submit_Date="" Submit_Lock="" Review_By=""
  Review_Date="" Review_Approve="" District_By="" District_Date="" District_Approve="" DOT_Approve="" DOT_By="" DOT_Date="">
- <WageAndHourRecord nameOfContractor="john doe" address="310 sw 23 rd gainesville, fl 32609" payrollNo="1001_1001" forWeekEnding="2007-08-25T00:00:00-
  04:00" SunDate="2007-08-19T00:00:00-04:00" MonDate="2007-08-20T00:00:00-04:00" TuesDate="2007-08-21T00:00:00-04:00" WedDate="2007-08-
  22T00:00:00-04:00" ThrsDate="2007-08-23T00:00:00-04:00" FriDate="2007-08-24T00:00:00-04:00" SatDate="2007-08-25T00:00:00-04:00" Data_Locked="True"
  Submit_By="duzgun" Submit_Date="2007-09-25T00:00:00-04:00" Submit_Lock="false" Review_By="duzgunagdas" Review_Date="2007-09-25T00:00:00-04:00"
  Review_Approve="" District_By="" District_Date="" District_Approve="" DOT_Approve="" DOT_By="" DOT_Date="">
<EmployeeWHRRecord employeeId="1001" employeeName="jane doe" employeeAddress="sw 23 rd ave. gainesville, fl 32601" exemptions="3" race="Hispanic"
  gender="Male" workClassification="11111111" otSunHours="1" stSunHours="8" otMonHours="2" stMonHours="8" otTuesHours="3" stTuesHours="8" otWedHours="3"
  stWedHours="8" otThrsHours="5" stThrsHours="8" otFriHours="4" stFriHours="8" otSatHours="5" stSatHours="8" otTotalHours="23" stTotalHours="56" otPayRate="25"
  stPayRate="35" otWeekGross="575" stWeekGross="1960" deductionFICA="25" deductionWithholding="5" deductionOther="45.5" deductionTotal="75.5"
  netWeekWages="2459.5" />
</WageAndHourRecord>
</Project>
</GML>
```

Figure 4-7 Uploaded data in XML format

Another result type is table. Following the same procedure as obtaining the XML result, user can view the table presentation of the uploaded data.

As can be seen, above table includes the same data as the XML file with some additional options. Submitter can lock the data he uploaded, preventing any changes. Before locking the data, he can make changes after uploading the data; however, once it's locked it can not be changed. Wage poster has the option to unlock the data he uploaded, though. Similar to the submitter, the approver has the option to lock the data. The only difference is that when the approver locks the data, submitter has no further control to change the data. An automated e-mail notification system is to inform the parties of these activities. The research team is currently working on that system. Excel result are essentially the table formatted data in excel and the obtaining procedure is exactly same as the other two.

Request Access Interface: Not related with the research for the time being.

WageAndHourRecord

nameOfContractor:

address:

payrollNo:

forWeekEnding:

SunDate:

MonDate:

TuesDate:

WedDate:

ThrsDate:

FriDate:

SatDate:

Data_Locked: True

Data Submitted By: duzgun

Data Submit Date: 2007-09-25T00:00:00-04:00

Data NOT Locked by Submitter:

Lock Data

Not Locked

No changes will be able to be made to this WageAndHourRecord's data while Review Approved. Only DOT Approval is needed to finalize this WageAndHourRecord.

Review Approval and Locked By: duzgunagdas

Approved and Locked

Remove Approval

Review Approval Date: 2007-09-25T00:00:00-04:00

District Approval and Locked By: N/A

Approve and Lock

Not Approved

District Approval Date: N/A

DOT Approval and Locked By: N/A

Approve and Lock

Not Approved

DOT Approval Date: N/A

Figure 4-8 Uploaded data in HTML table format

Assign Users to Existing Projects: The database hierarchy requires users to be assigned to existing projects. If the project is not yet defined, users can not be assigned to it. For the time being, research team will be the project creator, it is a different hierarchy level and due to security concerns together with the complicated nature of creating projects.

Create New User: Approvers will be allowed to create new users. Once the user is created an automated e-mail will be sent to the e-mail account with user name and password information in it. It is not necessary to be a project creator to create user accounts.

Modify existing User: Once created users can be modified afterwards through this link.

DEVELOPING THE PILE DRIVING RECORDS APPLICATION

In an attempt to enhance its data management practices for pile driving data, FDOT initiated the development of pile driving records software, whose installation file can be found at <http://www.dot.state.fl.us/construction/download/download%20page.htm>. The software has a simple interface that enables the users to record the driven pile related data during construction and then upload the recorded data to the geotechnical database that has been mentioned in previous chapters of this report. The software was designed to be XML compatible enabling the interface to do the data transportation to the database. The main motivation to develop such an automated system was due to the traditional paper based approach being time consuming and prone to errors. A more structured, error free data storage with the opportunity of having electronic data readily available upon recording it were the main goals of initiating the project. Although, the system was successful at uploading the data to the database seamlessly, the data management was not fully automated. In order to process the payment of the pile related construction, the pile quantities were manually recorded to pile driving quantities spreadsheet.

A similar approach to wage record was adopted to make the pile driving data retrieval process automated and seamless. Another unique and distinctive advantage of using XML as a tool to form a data bridge between two different software applications can be observed here. The research team formulated an excel spreadsheet, based on the original spreadsheet used by FDOT to manually input the driven pile quantities, to download the driven pile quantities that are uploaded to the geotechnical database by using the pile driving records software.

The mechanics of this application were essentially the same as the wage and hour record. This application file uses the same dll file to handle the security and technical details as to obtain the XML tree of a given project from the database and VBA programming and in-built XML compatibility of the Microsoft Excel made it possible to have the necessary data arrangements on the spreadsheet.

The application set up is exactly the same as the wage and hour record application. The application file needed and after installing the dll, the system will be ready to operate with the user names and passwords provided by the research team for the parties that uses the data. The data is uploaded to the geotechnical database that is used in wage and hour application. The website to obtain the data and navigate through the database are the same as the previous application.

Downloading Pile Quantities from the Database

The spreadsheet application has a button to be pressed to initiate the downloading procedure. Clicking the button will activate a VBA code that will retrieve the XML tree of the projects the user is entitled to. In order for user to download the data, he/she needs to type in the login information. Below is a screen shot of the procedure:



Figure 4-9 Pile quantity download login screen

Once the necessary information is entered, the application retrieves the information from the database.

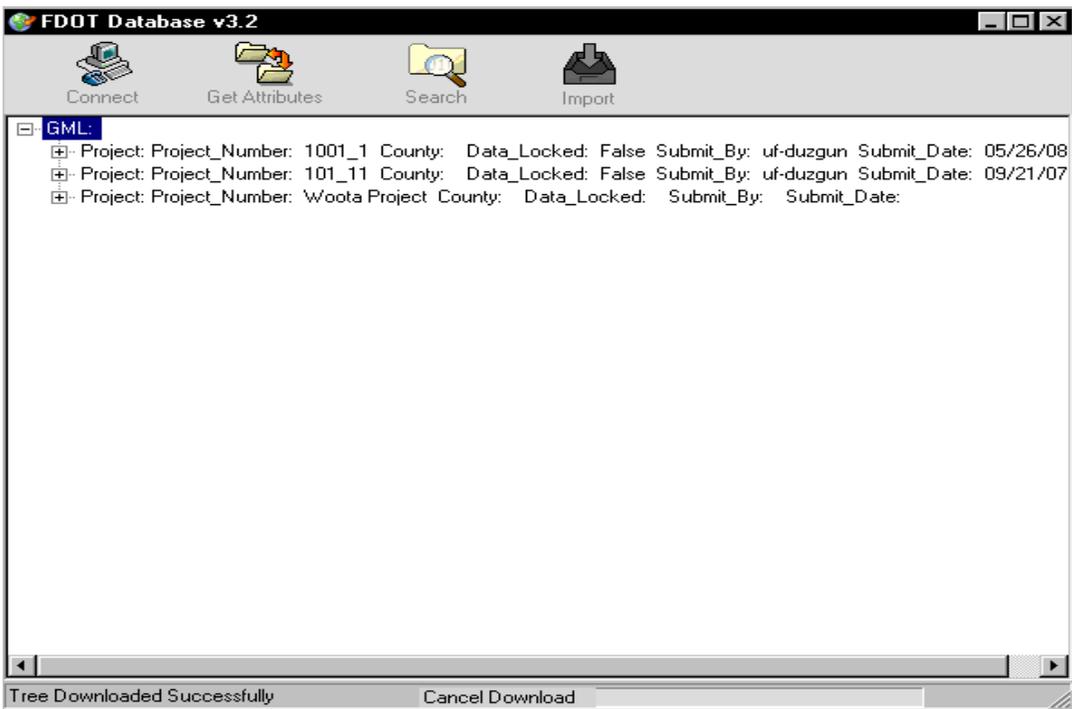


Figure 4-10 General XML tree view for an authorized user

The spreadsheet retrieves all the user related project data into a temporary drive and a popped up window enables user to navigate through the projects and get information about any specific project as desired. In order to that, the user needs to select a project and click on “Get Attributes” button, to download the details of project attributes to a local drive from the database. The last step to complete the finish downloading the data to the spreadsheet is achieved by pressing the “Import” button that places the retrieved attributes from the database in to the required cells. The examples of the pile quantities spreadsheets, both original and the completed application files, can be found in appendix B. The piling quantities spreadsheet records if the pile is a test pile, its production length and it’s weight to calculate the payment quantities. The original

spreadsheet has in-built formulas to compute the pay item reconciliation, invoices and do the invoice balancing.

FINDINGS

- The spreadsheet applications can be adopted by any user, as there is no need for any advanced hardware, software or formal training. The XML files created for exchange are small in size; do not require broadband connection or advanced software knowledge and the interfaces are simple enough for even the novice users.
- The transform protocol (dll version 3.2) and proper programming of the spreadsheets create a structured and secure way of interacting with the website. All the user interaction with the database is limited to XML trees and there is no need to disclose any information about the database for users to be able to exchange data. This not only reduces the security related risks, but also forces users to input the data in the form of the database structure which can be adjusted to the needs of the institution.
- More applications similar to those presented in this chapter of the report can be produced if needed with ease as the mechanics of the protocol are the same. With more investment the necessary forms can be developed and bundled under a more advanced application interface as in the case of some commercial software used in excel add-in format.

5. CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

A comprehensive review of the FDOT construction data transfer needs has indicated an opportunity for significant improvement through the use of XML standards. Existing XML schemas were found to be not fully adequate for FDOT use. Accordingly, schemas were developed in this project for all critical FDOT construction data input forms.

Additionally, two new applications were developed to improve the FDOT's information management capabilities. The first application facilitates contractor (or third party consultant) input of payroll compliance data, and FDOT verification and storage of the data.

The second application permits FDOT field project Offices to download pile payment quantities directly from the FDOT Geotech Database, a capability which is not available in SiteManager or in the Pile Technician Lob Book. Both these applications, serve to illustrate the potential benefits of XML standardization.

RECOMMENDATIONS

The research team offers the following recommendations based upon what has been learned in this study:

- The FDOT is encouraged to continue to invest in upgrading its data management systems to XML schema standards. Suggested schemas for construction data have been developed in this study.
- Implementation of the two application developed in this study is recommended.
- Standardization of the data structures and making that standard universally available, provides a great potential for competitive market development of future tools for the FDOT's business operations

APPENDIX A

FDOT CONSTRUCTION FORMS REVIEW AND DATA DICTIONARY

FDOT Construction Offices and Respective Forms

Aviation Office

Table A-1 Aviation Office Construction Forms

Form no	Form title
725-040-11	Airspace obstruction permit application
725-040-12	Airport site approval and license application
725-040-1	Airport license renewal application

Office of the Comptroller

Table A-2 Office of Comptroller Construction Forms

Form no	Form title
300-000-01	Travel form
300-000-06	Consultant travel form
350-020-03	Agreement summary sheet
350-020-04	Tentative acceptance agreement utility installation by DOT contractor
350-080-14	Application for refund from state of Florida

Construction Office

Table A-3 Construction Office Construction Forms

Form no	Form title
675-010-10	Nonconforming structural steel and miscellaneous metal component data sheet
675-030-03	Asphaltic concrete pay reduction summary sheet
675-060-10	Asphalt pavement straightedge test report
675-010-10	Nonconforming Structural Steel and Miscellaneous Metal Component Data Sheet
675-030-03	Asphaltic Concrete Pay Reduction Summary Sheet
675-060-10	Asphalt Pavement Straightedge Test Report
700-000-07	FDOT Construction Training Application Form
700-010-03	Consultant CEI 6 Month In-depth Review Report
700-010-05	Unilateral Payment
700-010-07	Additional Classification - Request Form

700-010-08 MOT Review Report
 700-010-11 Notice of Rental Agreement
 700-010-13 Daily Report of Construction
 700-010-14 Engineer's Weekly Summary
 700-010-15 Work Plan Controlling Item of Work
 700-010-17 Highway Lighting System Responsible Party Identification
 700-010-18 Signal Installation Responsible Party Identification
 700-010-25 Contractor's Past Performance Rating
 700-010-25 Contractors Past Performance Rating - OLD VERSION
 700-010-29 Work Progress Schedule Chart Figure A, Figure B and Figure C
 700-010-31 Memorandum of Overpayment
 700-010-32 Final Inspection and Acceptance of Federal-Aid Project
 700-010-36 Certification of Sublet Work
 700-010-38 Certification Disbursement of Previous Periodic Payment to Subcontractors
 700-010-42 Certification and Request for Payment for Stockpiled Materials
 700-010-43 State Construction Concurrence
 700-010-45 Supplemental Agreement
 700-010-47 FHWA Approval - Major and Minor Construction Changes
 700-010-48 Notice of Reimbursable/Nonreimbursable Utility Construction Work
 700-010-49 Post-construction Inventory Report
 700-010-50 Proctor Approval Request
 700-010-52 Contractor's Affidavit Vehicle Registration
 700-010-53 Subcontractor as Responsible Party for VAAP
 700-010-54 Labor Overtime Violation Withholding/Release
 700-010-56 Contractor's Time Extension Request
 700-010-59 Notification to Contractor and FHWA of Non-compliance with the Work Hours Act
 700-010-62 Federal Aid Ineligibility Notice-Response
 700-010-63 Employee Interview Report - Labor/EEO Compliance
 700-010-64 Engineer's Maintenance of Traffic Evaluation at Crash Site
 700-010-65 Design Build Bid Proposal Form
 700-010-67 Additional Federal Wage Rate Decisions
 700-010-68 Change Order
 700-010-69 Wage and Hour Record
 700-010-79 Contingency Supplemental Agreement
 700-010-80 Work Order for Unforeseen Additional Work
 700-010-84 Drilled Shaft Log (English/Metric)
 700-010-86 Drilled Shaft Rock Excavation Log (English/Metric)
 700-010-89 Drilled Shaft Concrete Placement Log (English/Metric)
 700-010-91 Drilled Shaft Construction & Pay Summary (English/Metric)
 700-010-94 Pile Driving Inspection Training Application
 700-010-96 Quality Assessment Review
 700-010-97 Quality Assessment Log
 700-010-98 Cross Slope Measurement Data Form
 700-010-99 In-House Constructability Grade

700-011-01	Disposition of Defective Material
700-011-02	DRB Three Party Agreement
700-011-03	Auger Cast-In-Place Pile Installation
700-011-04	Certification Work Done By Contractor or Subcontractor Under the Florida Minority Business
700-011-10	Contractor Quarterly Plant and Bed Inspection Report
700-011-11	Verification Plant and Bed Inspection Report
700-011-12	Contractor Monthly Plant Certification
700-011-13	Certification Compliance w/EEO Provisions on Federal Aid Contracts
700-020-01	Pile Driving Installation Plan Form
700-020-02	Construction Compliance with Specifications and Plans
700-020-03	Construction Certification of Quality Control Inspection
700-030-10	Noncomplying Prestressed/Precast Concrete Component Data Sheet
700-050-01	Area Computations
700-050-02	Curb and/or Gutter Computations
700-050-03	Linear Measurement, Component Weight, Per Hour, Per Day, or Per Each Computation
700-050-04	Volume Measure Items
700-050-05	Lump Sum Quantities
700-050-06	Weight Measure or Liquid Volume Computations
700-050-07	Concrete and Reinforcing Steel Computations
700-050-08	Piling Tabulation
700-050-09	Linear Measurement Computation with Components
700-050-10	Computation Book Pay Item Summary Sheet
700-050-12	Asphalt Roadway - As Built Pavement Data
700-050-12	Asphalt Roadway - As Built Pavement Data (LIMS)
700-050-20	Final Plans and Estimate Transmittal
700-050-21	Contractor's Affidavit and Surety Consent (Form 21-A)
700-050-22	Form 21-A (Modified) Surety Takeover
700-050-23	Record of Construction Materials Affidavit
700-050-25	Federal Wage Rate Affidavit
700-050-26	Final Interest Payment Log
700-050-27	Semifinal Interest Payment Log
700-050-28	Estimates Office Record of Final Plans and Documents
700-050-29	FHWA-47 Routing Sheet
700-050-30	DBE Utilization Certification
700-050-31	Contract Time
700-050-32	District Final Estimates Manager's Worksheet
700-050-33	Statement of Materials and Labor Used by Contractors on Highway Construction - Metric
700-050-34	Statement of Materials and Labor Used by Contractors on Highway Construction-English
700-050-35	Earthwork Survey/Cross Sections Waiver
700-050-36	Final Estimates Review Form
700-050-37	Contract Estimate Transmittal - Action Request

700-050-38	Certification As To Accuracy of Final Estimate
700-050-50	Off-Duty Police Officer Site Source Record
700-050-51	Daily Log Sheet Maintenance of Traffic Site Source Record
700-050-52	Daily Log Sheet (Striping) Site Source Record
700-050-53	Final Measurements Site Source Record
700-050-54	Daily Report of Truck - Measured Material Site Source Record
700-050-55	Daily Log Sheet Grassing Items Site Source Record
700-050-56	Daily Log Sheet Miscellaneous Tabulation Form Site Source Record
700-050-57	Lane Rental Site Source Record
700-050-58	Daily Record of Extra Work Site Source Record
700-050-59	Extra Work Summary Site Source Record
700-050-60	Field Book/Tally Book Log Site Source Record
700-050-62	Contractors Cert of Quantities - (MOT - Signs, etc.)
700-050-62	A Contractors Cert of Quantities - (MOT - Signs, etc) Continuation
700-050-63	Contractors Cert of Quantities - Bituminous Materials - Lump Sum
700-050-64	Contractors Cert of Quantities - Bituminous Materials – Tack/Prime Coat
700-050-65	Contractors Cert of Quantities - Bituminous Materials – Design-Build
700-050-66	Contractor's Cert of Quantities - Asphalt & Bituminous Material - Conventional Projects
700-050-67	MOT - Painted Pavement Markings - Daily Worksheet
700-050-68	MOT - Painted Pavement Markings - Contractors Monthly Certification of Quantities
700-050-69	Computer Summary of Quantities for Asphalt Concrete
700-050-70	Initial Retroreflectivity Reading Certification (Worksheet)

Contracts Administration Office

Table A-4 Contracts Administration Office Construction Forms

Form no	Form title
375-000-02	Fax order form
375-000-31	Bid document confidentiality agreement as to trade secret & proprietary documents
375-000-32	Bid document escrow affidavit
375-000-33	Bid document escrow agreement
375-020-09	Bid or proposal bond
375-020-18	Declaration of joint venture and power of attorney for bidding on specified
375-020-20	Bid protest bond
375-020-22	Certification of current capacity
375-020-37	Application for qualification for emergency debris removal

Environmental Management Office

Table A-5 Environmental Management Office Construction Forms

Form no	Form title
650-040-01	Permit transmittal memorandum
650-040-03	Stormwater pollution prevention plan construction inspection report
650-040-04	Owner/Operator certification preparation of documents and inspection report
650-040-05	Contractor certification preparation of documents--npdes general permit
650-040-07	Contractor certification/npdes general permit for storm water discharges
650-050-01	Letter of intent florida scenic highways program
650-050-02	Eligibility application florida scenic highways program
650-050-03	Field inventory form florida scenic highways program
650-050-04	Corridor impressions survey form florida scenic highways program
650-050-05	Designation application florida scenic highways program
650-050-06	Application for vegetation management at outdoor advertising signs
650-050-09	Permit for landscaping on state road right of way
650-050-10	Florida highway beautification council grant application

Equal Employment Opportunity Office

Table A-6 Equal Employment Opportunity Office Construction Forms

Form no	Form title
275-010-10	Title VI program and related statutes discrimination complaint
275-010-11	Title VI/Title VIII quarterly report
275-010-12	Construction contractors EEO report
275-020-01	Federal aid highway construction summary
275-020-02	O.J.T. monthly time report - Trenching machine operator
275-020-04	O.J.T. monthly time report - Asphalt lutean raker
275-020-07	On-the-job Training Schedule Compliance Check
275-020-08	Trainee enrollment and notification of personnel action
275-020-09	O.J.T. monthly time report - Concrete curb/sidewalk machine operator
275-020-13	O.J.T. monthly time report - Erosion control specialist
275-020-17	O.J.T. monthly time report - Earth wall erector
275-020-18	O.J.T. monthly time report - Installer/tester
275-020-19	O.J.T. monthly time report - Roller operator
275-020-20	O.J.T. monthly time report - Frontend loader operator
275-020-22	O.J.T. monthly time report - Highway or bridge ironworker, reinforcing
275-020-23	O.J.T. monthly time report - Scraper-pan operator
275-020-24	O.J.T. monthly time report - Form/Curb & gutter builder (structures)
275-020-25	O.J.T. monthly time report - Grade checker
275-020-26	O.J.T. monthly time report - Asphalt/Bridge deck screed operator
275-020-27	O.J.T. monthly time report - Highway concrete finisher

275-020-28 Equal employment opportunity officers
 275-020-29 O.J.T. monthly time report - Highway or bridge carpenter
 275-020-30 O.J.T. monthly time report - Pipelayer
 275-020-31 O.J.T. monthly time report - Backhoe operator
 275-020-35 O.J.T. monthly time report - Painter, highway or bridge
 275-020-36 O.J.T. monthly time report - Air compressor operator
 275-020-37 O.J.T. monthly time report - Asphalt distributor
 275-020-38 O.J.T. monthly time report - Asphalt paving machine operator
 275-020-39 O.J.T. monthly time report - Asphalt plant drier operator
 275-020-43 Certification of subcontract amount to DBE contractor
 275-020-44 O.J.T. monthly time report equipment maintenance technician
 275-020-45 O.J.T. monthly time report - Motor grader operator
 275-020-46 O.J.T. monthly time report - Milling machine operator
 275-020-47 O.J.T. monthly time report - Concrete paving finishing machine operator
 275-020-48 O.J.T. monthly time report - Concrete paving machine/ spreader operator
 275-020-49 O.J.T. monthly time report - Deckhand
 275-020-51 O.J.T. monthly time report - Mechanic
 275-020-58 O.J.T. monthly time report - Truck driver
 275-020-60 O.J.T. monthly time report - Tractor operator
 275-020-64 O.J.T. monthly time report - Stone and aggregate spreader operator
 275-020-65 O.J.T. monthly time report - Sign erector
 275-020-67 O.J.T. monthly time report - Pile driver
 275-020-70 O.J.T. monthly time report - Piledriver leadman
 275-020-71 O.J.T. monthly time report - Mixer operator
 275-020-75 O.J.T. monthly time report - Mason
 275-020-77 O.J.T. monthly time report - Landscape worker
 275-020-79 O.J.T. monthly time report - Instrument person
 275-020-80 O.J.T. monthly time report - Highway or bridge ironworker, structural
 275-020-81 O.J.T. monthly time report - Guard rail erector
 275-020-88 O.J.T. monthly time report - Crane, clamshell, backhoe, derrick, dragline
 275-020-93 O.J.T. monthly time report - Bulldozer operator
 275-020-94 O.J.T. monthly time report - Traffic signalization installer/mechanic
 275-020-96 On-the-job training schedule
 275-020-98 O.J.T. monthly time report - Traffic control specialist
 275-021-01 On-the-job training request for proficiency demonstration
 275-021-02 On-the-job training trainee interview
 275-021-03 Banking certificate of training
 275-021-04 Contractor certification of EEO/AA policy and plan adoption
 275-021-05 Supervisory and officeOffice personnel EEO meeting record
 275-021-06 Project personnel EEO meeting record
 275-021-07 Contractor company wide EEO report
 275-021-08 Contractor's annual july EEO report
 275-021-10 Inspection report for job site bulletin board
 275-021-11 Certificate of training
 275-021-12 Daily weekly report for on-the-job trainees
 275-021-13 Notification to FDOT of EEO office officer

275-030-01	Schedule a certification form no. 1
275-030-070	Application for construction management development program & bond guarantee
275-030-071	Application for small business certification (SBC)
275-030-073	Technical assistance request
275-030-074	Justification for bond guarantee
275-030-10	Bid opportunity list
275-030-11	DBE bid package information
275-030-11A	Anticipated DBE participation statement
275-030-11B	DBE affirmative action plan

Estimates Office

Table A-7 Estimates Office Construction Forms

Form no	Form title
600-00-02	Pay item request: New/Expanded structure

Financial Development Office

Table A-8 Financial Development Office Construction Forms

Form no	Form title
350-020-05	State infrastructure bank (SIB) application
350-020-08	State infrastructure bank (SIB) recipient semi-annual progress report
350-050-36	Local highway finance report (FHWA form 536)
350-090-17	Toll facility revolving trust fund quarterly report

Office of General Counsel

Table A-9 Office of General Counsel Construction Forms

Form no	Form title
050-020-26	Exempt documents request form
350-020-08	Statement of claim for property damage
350-050-36	Statement of claim property damage with personal injuries

Office of Information Systems

Table A-10 Office of Information Systems Construction Forms

Form no	Form title
325-060-05	FDOT computer security access request
325-060-06	Corporate account request

Office of General Inspector

Table A-11 Office of General Inspector Construction Forms

Form no	Form title
450-000-01	Self certification of accounting system and reimbursement rates

ITS Program Office

Table A-12 ITS Program Office Construction Forms

Form no	Form title
750-010-04	FAA notice of proposed construction or alteration
750-010-05	Application for antenna structure registration
750-040-01	Tower use agreement

Maintenance Office

Table A-13 Maintenance Office Construction Forms

Form no	Form title
010-000-07	Adopt-A-Highway litter removal agreement
375-020-01	Daily report of maintenance project
375-020-02	Maintenance project weekly summary
375-020-05	Contract maintenance work document
375-020-24	Maintenance contract time extension
375-020-40	Contractor's invoice
375-020-43	Contractor field performance report
850-000-15	Herbicide application log
850-005-01	Report of repair and certification of funds expenditure
850-005-02	State force and contract cost documentation
850-010-06	D: Load capacity information
850-010-16	Application for bridge inspection certification
850-030-05	Monitoring well inspection log
850-040-01	Overweight/Overdimensional permit
850-040-02	Request for special road use permit trip application
850-040-65	Request for temporary closing/special use of state road
850-040-70	Permit application for solicitation of contributions or to conduct safety break
850-040-71	Notification and request for facility use
850-040-72	Indemnification agreement
850-040-85	Permit for moving building over state roads
850-040-90	Application for permit to move building over state roads
850-045-01	Rest area comment card
850-045-05	Application for memorial monument
850-050-03	Inspection report (guardrail, reflectivity & single & multipost sign insp rpt)

850-055-01	Call box system testing, inspection and maintenance
850-055-02	Type II attenuator inspection report other type units
850-055-03	Type I attenuator inspection report
850-055-04	Attenuator inventory update
850-055-05	Type II attenuator inspection report - hi-dro cell sandwich and cluster
850-055-06	Type II attenuator inspection report - G-R-E-A-T
850-055-07	Type II attenuator inspection report - Sand barrel, energite and fitch
850-055-08	Type II attenuator inspection report - Hex foam sandwich
850-055-09	Type II attenuator inspection report - Guadguard
850-055-10	Type II attenuator inspection report - Brakemaster
850-055-11	Type II attenuator inspection report TAU - II

State Materials Office

Table A-14 State Materials Office Construction Forms

Form no	Form title
675-000-01	Qualification performance report
675-000-05	Laboratory qualification application
675-010-02	Compressive strength of concrete cylinders
675-010-03	Concrete design mix
675-010-04	Concrete design mix (Metric)
675-020-02	Aggregate system fine aggregate code form
675-020-03	Aggregate system base aggregate code form
675-020-04	Aggregate system coarse aggregate code form
675-020-05	Pipe backfill code sheet
675-020-06	Embankment, subgrade, and base code sheet
675-020-21	Density log sheet
675-020-22	Density log book
675-020-23	Density inspection report
675-020-25	Earthwork density report
675-020-26	Earthwork daily report of construction
675-020-27	Contractor quality control density record system
675-020-28	Verification earthwork density record system
675-030-02	Control charts for acceptance tests
675-030-04	Asphaltic concrete control strip density
675-030-06	Daily report of asphalt plant inspector
675-030-07	Daily report of asphalt paving inspector
675-030-08	Bituminous mixture summary
675-030-09	Pavement evaluation coring and condition data
675-030-10	Core out averages work sheet
675-030-17	Asphalt independent verification report
675-030-18	Asphalt plant - daily report of quality control
675-030-19	Asphalt plant - verification report
675-030-20	Asphalt roadway - daily report of quality control

675-030-21	Asphalt roadway - verification report
675-030-22	Asphalt plant - pay factor worksheets
675-030-22A	Asphalt plant - pay factor worksheets, July 2005 specification version
675-030-23	Asphalt resolution report
675-030-23A	Asphalt resolution report (LIMS)
675-030-24	Asphalt mix design summary report
675-030-24A	Asphalt mix design summary report, version 2 (excel 2003 - full install)
675-030-25	Asphalt plant worksheet
675-030-25A	Asphalt plant worksheet
675-050-01	Material release notification
675-050-02	Control of concrete
675-050-04	Sample transmittal card (C-22)
675-050-05	Mixer identification card
675-050-10	Delivery ticket for non structural concrete
675-070-01	Production joint welding procedure
675-070-02	Production joint weld procedure specification
675-070-03	Weld procedure qualification record
700-030-12	Referee analysis

Personnel Resource Office

Table A-15 Personnel Resource Office Construction Forms

Form no	Form title
250-025-01	Employee grievance form
250-025-01A	Employee grievance disposition
250-030-10	Exempt social security number request
250-035-01	Workers' compensation memorandum
250-050-02	Leadership academy: Individual implementation plan
250-050-11	TRESS course roster (without PDH's)

Office of Policy Planning

Table A-16 Office of Policy Planning Construction Forms

Form no	Form title
525-010-01	Interlocal agreement for creation of the metropolitan planning organization
525-010-02	Transportation planning funds joint participation agreement
525-010-03	Intergovernmental coordination and review and public transportation coordination

Procurement Office

Table A-17 Procurement Office Construction Forms

Form no	Form title
375-030-01	Request for qualification package for professional consultants
375-030-12	Standard professional services agreement
375-030-20	Disadvantaged business enterprise (DBE) certification
375-030-21	DBE participation statement
375-030-25	Task work order for professional services
375-030-26	Task work order amendment form for professional services
375-030-30	Truth in negotiation certification
375-030-31	MBE payment certification
375-030-32	Certification regarding debarment, suspension, ineligibility and voluntary exclusion
375-030-33	Certification for disclosure of lobbying
375-030-5B	Invoice summary sheet
375-030-5D	Invoice summary sheet (Multi-project/Task)
375-030-5E	One page invoice
375-040-18	Drug-free workplace program certification
375-040-24	MBE planned utilization
375-040-26	Bid or proposal bond
375-040-27	Performance bond
375-040-49	Credit card charge complaint

Project Management and Development Office

Table A-18 Project Management and Development Office Construction Forms

Form no	Form title
375-030-08A	Consultant schedule evaluation
375-030-08B	Consultant management evaluation
375-030-08C	Consultant quality evaluation - Type of work, group 2 project development and environmental
375-030-08D	Consultant quality evaluation - Type of work, group 3 highway design - roadway
375-030-08E	Consultant quality evaluation - Type of work, group 4 highway design - bridges
375-030-08F	Consultant quality evaluation - Type of work, group 5 bridge inspection
375-030-08G	Consultant quality evaluation - Type of work, group 6 traffic engineering and operation
375-030-08H	Consultant quality evaluation - Type of work, group 7 traffic operations design
375-030-08I	Consultant quality evaluation - Type of work, group 8 surveying and mapping

375-030-08J	Consultant quality evaluation - Type of work, group 9 soil exploration, material testing
375-030-08K	Consultant quality evaluation - Type of work, group 11 engineering contract administration
375-030-08M	Consultant quality evaluation - Type of work, group 13 planning
375-030-08N	Consultant quality evaluation - Type of work, group 14 architect
375-030-08P	Consultant quality evaluation - Type of work, group 15 landscape architect
375-030-08R	Consultant quality evaluation - Type of work, group 21 acquisition, negotiation, closing
375-030-08U	Consultant quality evaluation - Type of work, group 24 acquisition relocation assistance
375-030-08V	Consultant quality evaluation - Type of work, group 25 right of way clearing and leasing
375-030-08W	Consultant quality evaluation - Type of work, group 99 non-standard work type
375-030-08X	Consultant CEI work performance evaluation
375-030-08Z	Constructability evaluation
525-010-30	Federal-aid project funding request
525-010-32	Local agency program supplemental agreement
525-010-33	Local agency certification qualification agreement
525-010-40	Local agency program agreement
525-010-401	Local agency program agreement - Exhibit 1
525-010-40A	Local agency program agreement - Exhibit A
525-010-40B	Local agency program agreement - Exhibit B
525-010-40D	Local agency program agreement - Exhibit D
525-010-40L	Local agency program agreement - Exhibit L
525-010-40M	Local agency program agreement - Exhibit RL
525-010-40R	Local agency program agreement - Exhibit R
525-010-40T	Local agency program agreement - Exhibit T

Public Transportation and Modal Administrator Office

Table A-19 Public Transportation and Modal Administrator Office Construction Forms

Form no	Form title
725-030-06	Public transportation joint participation agreement
725-030-06E	EXHIBITS - Public transportation joint participation agreement
725-030-07	Public transportation supplemental joint participation agreement

Rail Office

Table A-20 Rail Office Construction Forms

Form no	Form title
---------	------------

Office of Right of Way**Table A-21 Office of Right of Way Construction Forms**

Form no	Form title
575-030-02	Representative authorization
575-030-03	Right of way negotiation contact record and suit information
575-030-07	Offer and purchase agreement
575-030-08	Counteroffer and purchase agreement
575-030-12	Donation of property to FDOT
575-030-15	Right of entry agreement
575-030-16	Closing statement
575-030-17	Application for payment of closing costs
575-030-18	Public disclosure affidavit
575-030-19	Public disclosure act exemption affidavit (Corporate - exempt)
575-030-20	Corporation exemption document
575-030-21	Public disclosure act exemption affidavit (Trust-exempt condemnation)
575-030-22	Public eminent domain document
575-030-24	Recommendation for settlement
575-030-25	Mediation report
575-030-27	Request for taxpayer identification number
575-030-30	Trial/Hearing report
575-030-31	Notice to owner
575-030-32	Notice to owner - Spanish
575-030-33	Notice to business owner
575-030-34	Notice to business owner - Spanish
575-030-35	Request for vendor identification number
575-030-36	Invoice for protective rent payment
575-040-01	Business survey questionnaire
575-040-02	Household survey questionnaire
575-040-03	Statement of eligibility for supplementary replacement housing payment for 90
575-040-03S	Statement of eligibility (Spanish) for supplementary replacement housing payment for 90
575-040-04	Relocation assistance costs
575-040-05	Replacement housing payment determination three comparables method
575-040-06	Statement of eligibility for supplementary replacement housing payment for own
575-040-06S	Statement of eligibility (Spanish) for supplementary replacement housing payment for 180-day
575-040-08	Hazardous substance letter
575-040-09	90-day letter of assurance
575-040-09S	90-day letter of assurance (Spanish)
575-040-10	Replacement housing payment transaction package
575-040-11	30-day notice to vacate
575-040-11S	30-day notice to vacate (Spanish)

575-040-12 Income certification
 575-040-13 Replacement housing questionnaire/ certification
 575-040-14 Application and claim for replacement housing payment
 575-040-15 Move cost estimate
 575-040-16 Search expense itemization
 575-040-17 Personal property inventory
 575-040-19 Receipt for business move options information packet
 575-040-20 Moving expense calculation and payment determination
 575-040-21 Moving cost transaction package
 575-040-22 Direct payment agreement
 575-040-23 Application and claim for reimbursement of moving costs
 575-040-24 Warrant acknowledgement
 575-040-25 Relocation payment appeal
 575-040-26 Trip log for reimbursement of search cost
 575-040-27 Labor cost worksheet
 575-040-28 Owned equipment usage and charges
 575-040-29 Receipt for information packet for residential moves
 575-040-30 Notice of eligibility nonresidential/ signs
 575-040-30S Notice of eligibility nonresidential signs (Spanish)
 575-040-31 Notice of eligibility residential
 575-040-31S Notice of eligibility residential (Spanish)
 575-040-32 Offer of benefits on-premise signs
 575-040-33 Notice of claim denial/right to appeal
 575-060-01 Property inventory
 575-060-02 Cash receipt form
 575-060-03 Affidavit
 575-060-04 Demolition and removal contract minus contract
 575-060-05 Demolition and removal contract plus contract
 575-060-06 Performance bond (Surety)
 575-060-07 Contract completion report
 575-060-08 Asbestos abatement contract
 575-060-09 Field inspection
 575-060-10 Performance bond (Cash)
 575-060-11 Release & Notice of non-friable asbestos containing materials temp.
 Leased/Occupied
 575-060-12 Collection form
 575-060-13 Non-collusion declaration and compliance with 49 CFR 29.
 575-060-16 Affidavit "asbestos abatement"
 575-060-17 Release and right of entry agreement for asbestos survey
 575-060-17S Release and right of entry agreement for asbestos survey (Spanish)
 575-060-18 Release and notice of non-friable asbestos containing materials (ACM)
 575-060-19 Release and notice of friable asbestos hazard
 575-060-22 Radon gas notification
 575-060-22S Radon gas notification (Spanish)
 575-060-31 Proposed lease notification
 575-060-32 Airspace agreement

575-060-33	Lease agreement
575-060-33S	Lease agreement (Spanish)
575-060-34	Initial O and M management plan review
575-060-35	Initial building survey review
575-060-36	Initial abatement technical specification review
575-060-37	Radon gas notification and disclosure of lead-based paint hazards warning
575-060-37S	Radon gas notification and disclosure of lead-based paint hazards warning (Spanish)
575-070-01	Outdoor advertising permit tag replacement request
575-070-02	Outdoor advertising license application
575-070-04	Application for outdoor advertising permit
575-070-12	Outdoor advertising permit cancellation certification
575-070-18	Application to place banners on non limited access right of way
575-070-25	Outdoor advertising permit transfer affidavit
575-095-07	Local agency program/FDOT right of way certification
575-095-09	Local agency program/FDOT - no additional right of way certification
575-095-10	Right of way certification - Design build
FLI-163	Logo application/annual permit renewal

Roadway Design Office

Table A-22 Roadway Design Office Construction Forms

Form No	Form Title
592-12	Drainage Connection Permit Application
592-13	Drainage Connection Permit

Safety Office

Table A-23 Safety Office Construction Forms

Form no	Form title
500-000-25	Detailed damage inspection report
500-065-01	Subgrant application for highway safety funds
500-065-04	Statement of highway safety project costs
500-065-05	Summary statement of personnel services cost
500-065-06	Personnel services time sheet
500-065-07	Detail of costs
500-065-09	Non-expendable property accountability record
500-065-17	Highway safety concept paper coversheet
500-065-18	Concept paper evaluation form

Specification Office

Table A-24 Specifications Office Construction Forms

Form no	Form title
630-020-01	Notification of alleged deficiency transportation products - Qualified prod

Structures Office

Table A-25 Structures Office Construction Forms

Form no	Form title
625-020-05	ADA constituent curb ramp request
625-020-06	ADA constituent accessible route request

Support Services Office

Table A-26 Support Services Office Construction Forms

Form No	Form Title
050-020-02	Records Submittal Request

Systems planning Office

Table A-27 Systems Planning Office Construction Forms

Form no	Form title
850-040-14	Driveway/Connection application category a (single family homes, duplexes)
850-040-15	Driveway/Connection application for all categories
850-040-16	Receipt of connection application and fee (or waiver of fee)
850-040-17	Record of waived requirements for all categories
850-040-18	Driveway connection permit for all categories
850-040-19	Record drawings report by permittee's professional engineer
850-040-20	Security instrument receipt
850-040-21	State highway access connection completeness review
850-040-22	Applicant time extension form
850-040-23	Proposed state hwy access driveway/connection notice of intent to deny permit
850-040-24	Proposed state highway access connection notice of intent to issue permit
850-040-26	Violation and notice to show cause

Traffic Engineering and Operations Office

Table A-28 Traffic Engineering and Operations Office Construction Forms

Form no	Form title
700-010-22	Final acceptance of traffic signal installation(s) & transfer of maintenance
750-010-02	Submittal data - traffic control equipment
750-010-03	Vehicle spot speed study
750-010-12	Application for traffic control device certification
750-010-13	Certified traffic control signal device complaint form
750-010-22	Traffic signal maintenance and compensation agreement
750-020-01	Traffic signal warrant summary
750-020-02	Summary of vehicle movements
750-020-03	Vehicle movements data sheet
750-020-04	Condition diagram
750-020-05	Collision diagram
750-020-06	Crash summary
750-020-07	Intersection delay study
750-020-08	Vehicle gap size study
750-020-09	Pedestrian volume sheet
750-020-10	Summary of pedestrian movement
750-020-11	Pedestrian group size
750-020-12	Safe curve speed study
750-020-13	No passing zone study
750-020-14	Travel time and delay study field data
750-020-15	Guidelines for determining the operational status of existing lighting facilities on freeway
750-020-16	Guidelines for determining the operational status of existing lighting
750-020-17	Guidelines for determining the operational status of existing lighting
750-020-18	Roundabout justification study
750-020-19	Travel time and delay study field summary
750-040-02	Closed circuit television camera (CCTC) agreement

Transit Office

Table A-29 Transit Office Construction Forms

Form no	Form table
725-030-01	State fleet program vehicle release form
725-030-02	State fleet equipment inspection
725-030-03	State fleet program report maintenance summary
725-030-04	Work order state fleet program
725-030-05	Lease agreement for department of transportation vehicles and equipment
725-030-08	State fleet program transit bus PM inspection

725-030-09	State fleet program preventive maintenance and inspection vans and wagons
725-030-10	Certificate of compliance for a section 5311 subrecipient
725-030-11	FDOT medical examination report for bus transit system driver

Turnpike Enterprise Office

Table A-30 Turnpike Enterprise Office Construction Forms

Form no	Form title
800-040-01	Qualification of tandem trailer equipment (Tractor)
800-040-02	Qualification of tandem trailer equipment (First or lead trailers)
800-040-03	Certification of insurance
800-040-04	General certification covering tandem trailer operations by permittee
800-040-05	Qualification for special permit to operate tandem trailer vehicle
800-040-06	Certification of tandem trailer equipment (Dolly converters)
800-040-07	Qualification for special certificate to operate tandem trailer vehicle

Utilities Office

Table A-31 Utilities Office Construction Forms

Form no	Form title
710-010-04	Utility work order change no. ___
710-010-05	Utility work schedule
710-010-06	Utility estimate summary
710-010-08	Required provisions for federal aid contracts with a UAO
710-010-09	Required provisions for federal aid contracts with an engineering contractor
710-010-12	Utility billing summary
710-010-18	Joint use of utility facilities agreement
710-010-20	Utility master agreement, (At UAO and FDOT expense combined)
710-010-21	Utility work by highway contractor agreement, (At FDOT expense)
710-010-22	Utility work by highway contractor agreement, (At utility expense)
710-010-30	State highway lighting, maintenance, and compensation agreement
710-010-50	Corporate resolution, delegation and special power of attorney
710-010-51	Delegation and special power of attorney
710-010-52	Roadway lighting system maintenance agreement
710-010-53	Roadway illumination services agreement
710-010-54	Utility work agreement (FDOT participating in expense)
710-010-55	Utility work agreement, (At UAO's sole expense)
710-010-56	Utility design by FDOT consultant agreement, (At utility expense)
710-010-57	Utility work by highway contractor agreement (Lump sum)
710-010-61	Utility exception
710-010-64	Utility work by highway contract master agreement (at UAO and FDOT expense combined)

710-010-65	Selective utility work agreement (FDOT participating in expense)
710-010-85	Utility permit

Selected Construction Forms

Construction Office construction forms

Table A-32 Selected Construction Office Construction Forms

Form no	Form title
700-010-08	MOT review report
700-010-15	Work plan controlling item of work
700-010-25	Contractors past performance report
700-010-64	Engineers maintenance of traffic evaluation at crash site
700-010-69	Wage and hour record
700-010-84	Drilled shaft log
700-010-86	Drilled shaft rock excavation log
700-010-89	Drilled shaft concrete placement log
700-050-08	Piling tabulations

Equal Employment Opportunity Office construction forms

Table A-33 Selected Equal Employment Opportunity Office Construction Forms

Form no	Form title
275-020-04	O.J.T. monthly time report - Asphalt luteman raker
275-020-07	On-the-job training schedule compliance check
275-020-08	Trainee enrollment and notification of personnel action
275-020-09	O.J.T. monthly time report - Concrete curb/sidewalk machine operator
275-020-13	O.J.T. monthly time report - Erosion control specialist
275-020-17	O.J.T. monthly time report - Earth wall erector
275-020-18	O.J.T. monthly time report - Installer/Tester
275-020-19	O.J.T. monthly time report - Roller operator
275-020-20	O.J.T. monthly time report - Front-end loader operator
275-020-22	O.J.T. monthly time report-Highway or bridge ironworker, reinforcing
275-020-23	O.J.T. monthly time report - Scraper-Pan operator
275-020-24	O.J.T. monthly time report - Form/Curb & gutter builder (Structures)
275-020-25	O.J.T. monthly time report - Grade checker
275-020-26	O.J.T. monthly time report - Asphalt/Bridge deck screed operator
275-020-27	O.J.T. monthly time report - Highway concrete finisher
275-020-29	O.J.T. monthly time report - Highway or bridge carpenter
275-020-30	O.J.T. monthly time report - Pipelayer
275-020-31	O.J.T. monthly time report - Backhoe operator
275-020-35	O.J.T. monthly time report - Painter, highway or bridge
275-020-36	O.J.T. monthly time report - Air compressor operator
275-020-37	O.J.T. monthly time report - Asphalt distributor

275-020-38	O.J.T. monthly time report - Asphalt paving machine operator
275-020-39	O.J.T. monthly time report - Asphalt plant drier operator
275-020-43	Certification of subcontract amount to DBE contractor
275-020-44	O.J.T. monthly time report equipment maintenance technician
275-020-45	O.J.T. monthly time report - Motor grader operator
275-020-46	O.J.T. monthly time report - Milling machine operator
275-020-47	O.J.T. monthly time report- Concrete paving finishing machine operator
275-020-48	O.J.T. monthly time report- Concrete paving machine/spreader operator
275-020-49	O.J.T. monthly time report - Deckhand
275-020-51	O.J.T. monthly time report - Mechanic
275-020-58	O.J.T. monthly time report - Truck driver
275-020-60	O.J.T. monthly time report - Tractor operator
275-020-64	O.J.T. monthly time report - Stone and aggregate spreader operator

Materials Office construction forms

Table A-34 Selected Materials Office Construction Forms

Form no	Form title
675-010-02	Compressive strength of concrete cylinders
675-010-03	Concrete design mix
675-020-22	Density log book

Data Inventory of Selected Construction Forms

700-010-08 MOT review report

Table A-35 Data inventory of MOT Review Report

Label on the form	Data type
TAGS	
Report No	Integer
Contract No.	Integer
Fin No	String
Federal Aid Project No	String
Project Administrator	String
Week of Contractor Review	Integer
Date of Department / Representative Review	Date
Current Project Phase	String
Project Location	String
Areas to be Reviewed	String
DATA	
Traffic Control Plan	
TCP/Alternate TCP/modifications approved	String/Code List
Signed & marked according to plan	String/Code List
Side streets signed properly	String/Code List

Speed limit reduction necessary with sign located properly	String/Code List
Needed turn lanes in place	String/Code List
General	
Signs correct height & offset	String/Code List
Sidewalk closed/school marking/ crosswalk signs placed properly	String/Code List
Driveway & median access adequate	String/Code List
Signal timing/phasing adequate	String/Code List
Sufficient warning signs in place	String/Code List
Existing signs not in use removed or covered	String/Code List
Sufficient devices to guide traffic through the work area	String/Code List
Roadway surface maintained satisfactorily	String/Code List
Message boards convey concise message to motorists	String/Code List
Night Work	
Lighting plan approved	String/Code List
Variable message sign warning lighted work zone ahead	String/Code List
Equipment has flashing lights and/or reflective sheeting	String/Code List
Pilot vehicle with flashing lights and message board	String/Code List
Lighting aimed not to impede traffic	String/Code List
Clear Zone/Hazards	
No equip./ mat./ stored in clear zone	String/Code List
No unprotected drop-offs >3"	String/Code List
Temporary Pavement Markings	
Correct applications and width	String/Code List
Reflectivity condition satisfactory	String/Code List
Conflicting markings and pavement debris removed	String/Code List
Temporary Barrier Wall	
Is wall connected and anchored per appropriate rdwy or structures index	String/Code List
Is transition per index `	String/Code List
Has proper end treatment been installed correctly	String/Code List
Proper position and lights maintained	String/Code List
Flaggers	
List of trained flaggers submitted to project admin. before construction begins	String/Code List
Flagger ahead sign installed properly	String/Code List
Flagger wearing approved safety vest/using proper stop/slow paddle	String/Code List
Lane Closures	
Proper transition, sight distance and buffer lengths	String/Code List
Proper device spacing and visibility	String/Code List

Pavement markings placed correctly	String/Code List
Proper merging	String/Code List
Detours	
Proper signing and pavement marking	String/Code List
PedestrianBicyclistAccomodations	
Separated from work operations and traffic	String/Code List
Proper signing with proper travel paths	String/Code List
BusinessAccomodations	
Vehicle and pedestrian entrances maintained	String/Code List
With proper devices, signing and visibility	String/Code List
TrafficControlDevices	
Cones	String/Code List
Drums	String/Code List
Lights (A,B, & C)	String/Code List
Flags	String/Code List
Signs	String/Code List
RPMs	String/Code List
Arrow	String/Code List
Board	String/Code List
VMS	String/Code List
Paddle	String/Code List
Barricades	String/Code List
Remarks (optional attribute for properties)	String/Code List

700-010-15 Work plan controlling item of work

Table A-36 Work Plan Controlling Item Of Work Form Data Inventory

Label on Form	Data Type
TAGS	
Financial project ID	String
Contract no.	String
DATA	
Description	String
Location/Limits	String
Prime contractor or subcontractors will work	Integer
Contractor's comments	String
Submitted by	String
PE comments	String
Approved by	String

700-010-25 Contractors past performance report

Table A-37 Contractors Past Performance Report Data Inventory

Label on Form	Data Type
TAGS	
Contractor name	String
FIN project no.	String
Address	AddressType
County	String
Contract no.	String
Final contract amount	Double
Type of work	String
Proj. administrator/firm or residency	String
Date final accepted	Date
DATA	
Pursuit of the work	Integer
Proper MOT and minimize impacts to traveling public	Integer
Timely and complete submittal of documents	Integer
Timely completion of project	Integer
Coordination / Cooperation with CEI personnel, property owners and utilities company	Integer
Mitigate cost and time overruns	Integer
Environmental compliance	Integer
Conformance with contract documents	Integer
DBE utilization	Integer

700-010-64 Engineers maintenance of traffic evaluation at crash site

Table A-38 Engineers Maintenance Of Traffic Evaluation At Crash Site Form Data Inventory

Label on Form	Data Type
TAGS	
Date/Time of occurrence	dateTime
Report date	Date
FIN project no	String
State road no	String
District	Integer
Federal project no	String
County	String
Contract no	String
WPI no.	String
DATA	

Other crashes in the same vicinity of the work zone	Boolean
If yes, dates.	Date
Police investigation	Boolean
Work zone location of crash	String
The immediate area at the crash site in accordance with state standards, MUTCD and TCP	Boolean
Enhancements to the MOT at the crash site	Boolean
List enhancements to be made to the work site.	String
Analysis Of Conditions	
Pavement	String/Code List
Visibility	String/Code List
Routing	String/Code List

700-010-69 Wage and hour record

Table A-39 Wage And Hour Record Data Inventory

Label on the form	Data type
Name of contractor/subcontractor	String
Address	Address
OMB no	String
Payroll no.	String
For week ending	Integer
Project and location	String
Financial project number	String
DATA	
Name of the employee	String
Address of the employee	Address
Social security number of the employee	String
No. of withholding exemptions	Integer
Work classification	String
Day and date	Date
Hours worked each day	Integer
Total hours	Integer
Rate of pay	Double
Gross amount earned	Double
Deductions	
FICA	Double
Withholding tax	Double
Other	Double
Total deductions	Double
Net wages paid for week	Double

700-010-84 Drilled shaft log

Table A-40 Drilled Shaft Log Data Inventory

Label on Form	Data Type
TAGS	
Project name	String
FIN project no.	String
Contractor	String
Inspection by	String
Date	Date
Approved by	String
Date	Date
Page	Integer
Pier no.	String
Shaft no	String
Station	String
Offset	gml:MeasureType
DATA	
Casing Info	
ID	gml:MeasureType
OD	gml:MeasureType
Length	gml:MeasureType
Type	gml:MeasureType
Top elev.	gml:MeasureType
Bot. elev.	gml:MeasureType
Depth	gml:MeasureType
TIME	
In	Time
Out	Time
Soil Des. And Notes	String/Code List
Time Information	
Data opened	Date
Date cased	Date
Data poured	Date
Elevations	
Reference elev. (ft)/(m)	gml:MeasureType
Ground surface slev. (ft)/(m)	gml:MeasureType
Water table elev. (ft)/(m)	gml:MeasureType
Cutoff elev. (ft)/(m)	gml:MeasureType
Tip elev. (ft)/(m)	gml:MeasureType
Dimensions	
Soil auger diameter (ft)/(m)	gml:MeasureType
Dia. of rock socket (ft)/(m)	gml:MeasureType
Rock socket length (ft)/(m)	gml:MeasureType
Dia. of overburden shaft (in)/(mm)	gml:MeasureType

Overburden shaft length (ft)/(m)	gml:MeasureType
Constructed shaft length (ft)/(m)	gml:MeasureType
Drilling mud	
Type	String/Code List
Test results	String/Code List
Meet specifications	Boolean
Concrete volume	
Theoretical (cy)/(m.)	gml:MeasureType
Actual (cy)/(m.)	gml:MeasureType
Ratio (A/T)	Double
Rebar cage check list	
Proper # vert. bars	Boolean
Proper # horz. bars	Boolean
Side standoffs	Boolean
Epoxy condition	Boolean
Ties & connections	Boolean
Clean out	
Bottom cleanout method	String/Code List
Time and date of final cleanout	dateTime
Shaft bottom check	
Inspection type	String/Code List
Time started	Time
Time finished	Time
Avg. shaft bottom elev. (ft)/(m)	gml:MeasureType
Est. shaft diameter (ft)/(m)	gml:MeasureType
Comments	String
Approved	Boolean

700-010-86 Drilled shaft rock excavation log

Table A-41 Drilled Shaft Rock Excavation Log Data Inventory

Label on form	Data type
TAGS	
Project name	String
FIN project no.	String
Contractor	String
Inspection by	String
Date	Date
Approved by	String
Date	Date
Page	Integer
Pier no.	String
Shaft no	String
Station	String
Offset	gml:MeasureType

DATA	
Rock auger diameter	gml:MeasureType
Core tool diameter	gml:MeasureType
Overream tool diameter	gml:MeasureType
Reference elev.	gml:MeasureType
Msd. top of rock elev.	gml:MeasureType
Msd. shaft bottom elev.	gml:MeasureType
Notes	String
Depth	gml:MeasureType
Elev.	gml:MeasureType
Rpm	gml:MeasureType
Time	Time
Rock description & notes	String
Sample recovery	gml:MeasureType
Type of core tool	String/Code List
Core tool length	gml:MeasureType
Mas. sample length	gml:MeasureType
Core sample diam.	gml:MeasureType
Length of core run	gml:MeasureType
Length of recovery	gml:MeasureType
Sample length > 4"/100mm	gml:MeasureType
Notes	String
Reference elev.	gml:MeasureType
Rod + Tool	String
Length above	gml:MeasureType
Top of core	gml:MeasureType
% Rec. (SR/LR) x 100% = (/) x 100% =	Double
RQD (L4/LR) x 100% = (/) x 100% =	Double

700-010-89 Drilled shaft concrete placement log

Table A-42 Drilled Shaft Concrete Placement Log Data Inventory

Label on form	Data type
TAGS	
Project name	String
FIN project no.	String
Contractor	String
Inspection by	String
Date	Date
Approved by	String
Date	Date
Page	Integer
Pier no.	String
Shaft no	String
Station	String

Offset	gml:MeasureType
DATA	
Placement method	String/Code List
Deairing method	String/Code List
Volume in lines	gml:MeasureType
#	String
ID	String
Length	gml:MeasureType
Volume	gml:MeasureType
Total volume in lines	gml:MeasureType
Reference elev.	gml:MeasureType
Shaft top elev.	gml:MeasureType
Top of rock elev.	gml:MeasureType
Shaft bottom elev.	gml:MeasureType
Depth to water inside	gml:MeasureType
OD casing at start	gml:MeasureType
Rebar cage top elev. at start	gml:MeasureType
At finish	gml:MeasureType
Truck no.	Integer
Concrete volume	gml:MeasureType
Arrival time	Time
Start time	Time
Finish time	Time
Tremie depth	gml:MeasureType
Depth to concrete	gml:MeasureType
Notes	String
Concrete volume delivered	gml:MeasureType
Placement time (Casing removed)	Time
Casing Removal	
OD casing at start	gml:MeasureType
Top elev.	gml:MeasureType
Bot. elev.	gml:MeasureType
Start	gml:MeasureType
Finish	gml:MeasureType
Rebar cage centered	Boolean
Concrete finished	Boolean
Notes	String
Volume delivered	gml:MeasureType
Volume in lines	gml:MeasureType
Wastage	gml:MeasureType
Volume placed=VD-VL-VW	gml:MeasureType
Theoretical vol.	gml:MeasureType
Overpour(VP-VT)	gml:MeasureType

700-050-08 Piling tabulation

Table A-43 Piling Tabulation Data Inventory

Label on form	Data type
Design Original Quantity	
Structure component identification	String/Code List
No. req'd	Integer
Length each	gml:MeasureType
Total length	gml:MeasureType
Reference/Remarks	String
Construction Final Quantity	
Authorized furnished	gml:MeasureType
Pay Length	
Furnished	gml:MeasureType
Driven	gml:MeasureType
Reference	String
Over/Under run from design original	
Furnished	gml:MeasureType
Driven	gml:MeasureType
Page total	gml:MeasureType
Project grand total	gml:MeasureType
Explanation of over/under run	
Piling furnished	gml:MeasureType
Piling driven	gml:MeasureType

275-020-04 O.J.T. monthly time report - Asphalt luteman raker

Table A-44 O.J.T. Monthly Time Report - Asphalt Iuteman Raker Form Data Inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List

DATA	
Orientation and Observation	
Safety procedures	Integer
Observation of placement of material	Integer
Performs duties as asphalt shoveler/raker; spreading and smoothing hot mix laid by paver	Integer
Care and Maintenance	
Safety procedures	Integer
Routine cleaning, fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safe operating procedures	Integer
Perform duties using hand brooms, power brooms, shovels and power blowers	Integer
Adjustment of screed to regulate width and depth of material, smoothing rough spots and filling depressions	Integer
Total hours(min/max)	Integer
Performance of trainee	String/Code List

275-020-07 OJT schedule conformity report

Table A-45 OJT schedule conformity data inventory

Label on form	Data type
TAGS	
Contractor's name	String
Date of check	Date
Resident compliance specialist	String
Financial project no	String
FAP No	String
Contractor no	String
Contract day no	Integer
Corresponding calendar date	Date
Total contract days allowed	Integer
Job progress %	Double
Time elapsed %	Double
Number of trainees required	Integer
Number being trained in this project	Integer
Banked credit	Double
Total	Double
DATA	
Training classification	String/Code List
Number scheduled to start prior to noted contract day	Integer
Number enrolled prior to noted contract day	Integer
(1) Number completed with major portion of	

training on this project	Integer
(2) Number with major portion of training completed on this project and still in training elsewhere	Integer
(3) No currently in training on this project	Integer
(4) No scheduled to start after noted contract day	Integer
Total no scheduled to start prior to noted contract day	Integer
Total number enrolled prior to noted contract day	Integer
Total number completed with major portion of training on this project	Integer
Total no with major portion of training completed on this project and still in training elsewhere	Integer
Total number currently in training on this project	Integer
Total no scheduled to start after noted contract day	Integer
Summation of 1,2,3 and 4	Integer
Banked credit	Integer
Trainees required	Integer

275-020-08 Trainee enrollment and notice of personnel action

Table A-46 Trainee enrollment and notice of personnel action form data inventory

Label on the form	Data type
TAGS	
Financial project no	String
FAP no	String
Contract no	String
County	String
District	Integer
Contractor name	String
FEID no	String
DATA	
Enrollment & Trainee Identification	
Proposed training classification	String
Trainee's name (first/ middle initial /last)	String
Trainee social security no.	String
Trainee's race	String/Code List
Sex	Boolean
Date of birth	Date
Trainee's mailing address	Address
Instructor's name & classification	String
Annual family income	Integer
Trainees annual income	Integer
No. of dependants	Integer
List previous classifications for which training was	

received and list classifications worked in	String
Enrollment date requested	Date
Contractor's signature & date	String
Date	Date
Enrollment approval	
Acceptable trainee interview	Boolean
Enrollment approved	Boolean
DCCM signature & date	String
Date	Date
Graduation Request	
Date of successful observation	Date
Proficiency demonstrated at milestone	Boolean
Total accumulated training hours	Integer
Contractor's signature	String
Graduation Approval	
Graduation approved	Boolean
DCCM signature & date	Date
Date	Date
Contractor's Request to Award Banking Certificate	
Contractor's signature & date	Date
Date	Date
Banking Approval	
Banking approved	Boolean
(DCCM) signature & date	Date
Trainee Transfer Request	
Financial project no. transferred to	Integer
F.A.P no.	Integer
District	String
Hrs prior to transfer	Integer
Effective date	Date
Contractor's signature & date	Date
Date	Date
Transfer Approval	
Sending DCCM Signature & Date	String
Date	Date
Receiving DCCM Signature & Date	Date
Date	Date
Notice of Termination Prior To Graduation	
Type of termination	Boolean
Reason for termination	String
Effective date	Date
Hrs accum. at term.	Integer

275-020-09 O.J.T. monthly time report - Concrete curb/sidewalk machine operator

Table A-47 O.J.T. monthly time report - Concrete curb/sidewalk machine operator data inventory

Label on the form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Safety procedures	Integer
Observation of setting and checking line and grade	Integer
Observation of proper maintenance	Integer
Observation of proper machine operation	Integer
Care and Maintenance	
Safety procedures	Integer
Helping with machine maintenance	Integer
Actual Operation of Curb Machine And Setting Line And Grades	
Safety operating procedures	Integer
Setting and driving pins and setting braces in	Integer
Set and operate machine, check lines before, during and after each pour	Integer
Total hours(min/max)	Integer
Performance of trainee	String/Code List

275-020-13 O.J.T. monthly time report - Erosion control specialist

Table A-48 O.J.T. monthly time report - Erosion control specialist data dictionary

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String

County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Knowledge of regulating permits, NPDES/SWPPP.	Integer
Ability to identify erosion control devices	Integer
Identify conditions which could result in erosion and how to resolve quickly	Integer
Operation and maintenance of erosion control devices according to the erosion control plan	Integer
Actual Review Of Erosion Control Operations	
Observation of in place erosion control devices	Integer
Review of erosion control through construction area	Integer
Field placement of erosion control devices	Integer
Observations	
Obs. of erosion control devices in proper locations	Integer
Routine inspection procedures	Integer
Total hours(min/max)	Integer
Performance of trainee	String/Code List

275-020-17 O.J.T. monthly time report - Earth wall erector

Table A-49 O.J.T. monthly time report - Earth wall erector data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Safety procedures	Integer

Observation of placing wall units	Integer
Obs. of tie back placement and backfill procedures	Integer
Care and Maintenance	
Safety procedures	Integer
Help unload wall sections and clean work area	Integer
Actual Operation of Wall Erection and Backfill	
Safety operating procedures	Integer
Hold and help align wall sections	Integer
Observe and assist in setting precast wall units	Integer
Measures space between walls, fits together,	Integer
Assist in compaction, grading by hand, and	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-18 O.J.T. monthly time report - Installer/Tester

Table A-50 O.J.T. monthly time report - Installer/Tester form data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation, Observing and Applied Calculation	
Safety procedures	Integer
Equipment and tools	Integer
Tower climbing, fit connectors	Integer
Systems calculations, net path loss, surveying	Integer
Catalog use	Integer
Applied Techniques of the Installation/Testing	
Winch truck operation	Integer
Rigging and tagging	Integer
Coax installation, test equipment	Integer
Grounding, calibrate path boxes	Integer
Path alignment	Integer
Pressurization	Integer

Contract Administration	
Reading plans and special app. and functions	Integer
Report writing	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-19 O.J.T. monthly time report - Roller operator

Table A-51 O.J.T. monthly time report - Roller operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Safety procedures	Integer
Observation of machine in operation	Integer
Explanation of rolling procedures	Integer
Care and Maintenance	
Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safe operating procedures	Integer
Rough: Rolls embank base or surface	Integer
Finish roller: Rolls asphalt surfaces or bases to	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-20 O.J.T. monthly time report - Front-end loader operator

Table A-52 O.J.T. monthly time report - Front-end loader operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String

FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Safety procedures	Integer
Observation of machine in operation	Integer
Starting and manipulating levers for moving	Integer
Care and Maintenance	
Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safety procedures	Integer
Loading materials	Integer
Excavation	Integer
Special applications	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-22 O.J.T. monthly time report-Highway or bridge ironworker, reinforcing

Table A-53 O.J.T. monthly time report-Highway or bridge ironworker, reinforcing, data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	

Safety procedures	Integer
Observation of operation	Integer
Care and Maintenance	
Safety procedures	Integer
Care and maintenance of tools and equipment	Integer
Actual Operation of Reinforcing	
Places reinforcing steel in form	Integer
Ties reinforcing steel in form	Integer
Sets rods in place	Integer
Spaces and wires reinforcing rods	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-23 O.J.T. monthly time report - Scraper-Pan operator

Table A-54 O.J.T. monthly time report - Scraper-Pan operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Safety procedures	Integer
Observation of machine in operation	Integer
Starting and manipulating levers for moving	Integer
Care and Maintenance	
Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safe operating procedures	Integer
Loading	Integer
Spreading material	Integer
Rough roadway grading	Integer
Compaction of embankment	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-24 O.J.T. monthly time report - Form/Curb & gutter builder

Table A-55 O.J.T. monthly time report - Form/Curb & gutter builder data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Safety procedures	Integer
Obs of operations including placing of forms	Integer
Observation of form stripping and setting	Integer
Care and Maintenance	
Safety procedures	Integer
Care and maintenance of hand and power tools	Integer
Help strip forms and clean work area; steel forms	Integer
Applied Techniques of Building Curb and Gutter and Actual Operation of Formsetting	
Safety operating procedures	Integer
Hold, set and help align forms, Drive stakes for	Integer
Observe and assist in setting precast concrete	Integer
Measures space between forms fits together	Integer
Check forms while concrete is being poured	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-25 O.J.T. monthly time report - Grade checker

Table A-56 O.J.T. monthly time report - Grade checker data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String

County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Safety procedures	Integer
Observation of placing grade pins and line	Integer
Observation of setting and checking grade	Integer
Actual Operation of Setting and Checking Grade	
Safe operating procedures	Integer
Helping set grade pins and lines; helping achieve	Integer
Setting and driving pins and braces in place	Integer
Observe and assist in setting grade, transferring	Integer
Check grade and lines before and after grading	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-26 O.J.T. monthly time report - Asphalt/Bridge deck screed operator

Table A-57 O.J.T. monthly time report - Asphalt/Bridge deck screed operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Safety procedures	Integer
Observation of machine in operation	Integer
Care and Maintenance	
Safety procedures	Integer
Routine servicing	Integer

Actual Operation of Equipment	
Safety procedures	Integer
Making adjust for proper depth, grade and finish	Integer
Operating screed equipment	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-27 O.J.T. monthly time report - Highway concrete finisher

Table A-58 O.J.T. monthly time report - Highway concrete finisher data inventory

<u>Label on form</u>	<u>Data type</u>
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Observation	
Safety procedures	Integer
Observation of use of straight edges, floats and	Integer
Observation of forming a finishing of edges and	Integer
Observe use of concrete finishing machine	Integer
Care and Maintenance	
Safety procedures	Integer
Routine cleaning of work area and materials	Integer
Actual Operation of Equipment	
Safety operating procedures	Integer
Basic operation of tools	Integer
Forming and finishing edges, joints, curbs, gutter	Integer
Operation of trowels, straight edges, floats of	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-29 O.J.T. monthly time report - Highway or bridge carpenter

Table A-59 O.J.T. monthly time report - Highway or bridge carpenter data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Power and hand tools	Integer
Materials selection	Integer
Applied Techniques of Bridge Construction Carpentry	
Safety procedures	Integer
Pier, pile, and cap formwork	Integer
Decking formwork	Integer
Parapet and hand railing formwork	Integer
Endwall formwork, box culverts, inlets and	Integer
Blueprint or construction plans reading	Integer
Stripping and Salvage of Forms for Re-Use	
Safety procedures	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-30 O.J.T. monthly time report - Pipelayer

Table A-60 O.J.T. monthly time report - Pipelayer data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String

Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of spade operation and laying of pipe	Integer
Study of various types of pipe and related materials	Integer
Care and Maintenance	
Safety procedures	Integer
Ditch preparation, handles materials and tools	Integer
Actual Handling of Pipe and Spade	
Safe operating procedures	Integer
Ditch grading with compressed air driven or hand	Integer
Handles materials, assist in lowering pipe	Integer
Lays all types of pipe and duct.	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-31 O.J.T. monthly time report - Backhoe operator

Table A-61 O.J.T. monthly time report - Backhoe operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of Machine in Operation	Integer
Starting, manipulating levers for moving equipment	Integer
Care and Maintenance	

Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safety operating procedures	Integer
Trenching operations (for pipelaying, etc.)	Integer
Excavation (for structures, footings, etc.)	Integer
Special applications and functions	Integer
Actual handling of pipe and spade	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-35 O.J.T. monthly time report - Painter, highway or bridge

Table A-62 O.J.T. monthly time report - Painter, highway or bridge data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of operation	Integer
Care and Maintenance	
Safety procedures	Integer
Care and maintenance of tools	Integer
Actual Operation of Equipment	
Safety procedures	Integer
Paints cables and structural steel framework of	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-36 O.J.T. monthly time report - Air compressor operator

Table A-63 O.J.T. monthly time report - Air compressor operator data inventory

Label on form	Data type
---------------	-----------

TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of equipment in operation	Integer
Starting, stopping and regulating valves	Integer
Care and Maintenance	
Safety procedures	Integer
Routine lubricating and servicing	Integer
Actual Operation of Equipment	
Safe operating procedures	Integer
Connecting pipes from compressor to equipment	Integer
On-the-job operation	Integer
Special applications	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-37 O.J.T. monthly time report - Asphalt distributor

Table A-64 O.J.T. monthly time report - Asphalt distributor data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer

Observation of machine operation	Integer
Starting and manipulating valves and levers to Care and Maintenance	Integer
Safety procedures	Integer
Routine fueling, lubricating and servicing Actual Operation of Equipment	Integer
Safe operating procedures	Integer
Regulates valves and levers to distribute oil	Integer
Operation of equipment	Integer
On-the-job training	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-38 O.J.T. monthly time report - Asphalt paving machine operator

Table A-65 O.J.T. monthly time report - Asphalt paving machine operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of machine operation (as a passenger)	Integer
Starting and manipulating valves and levers to Care and Maintenance	Integer
Safety procedures	Integer
Routine fueling, lubricating and servicing Actual Operation of Equipment	Integer
Safe operating procedures	Integer
Screed regulation indoctrination and operation	Integer
Operation of Machine	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-39 O.J.T. monthly time report - Asphalt plant drier operator

Table A-66 O.J.T. monthly time report - Asphalt plant drier operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of drier and conveyors in operation	Integer
Starting drier and conveyors for batching	Integer
Care and Maintenance	
Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safe operating procedures	Integer
Drier regulation, indoctrination and operation	Integer
Conveyor starting and observation	Integer
Operation of drier	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-43 Certification of subcontract amount to DBE contractor

Table A-67 Certification of subcontract amount to DBE contractor data inventory

Label on form	Data type
TAGS	
WPI number	String
Project number	String
FAP number	String
County	String
Subcontractor's name	String

Address	Address
Telephone no	String
DATA	
Type of work	String
Subcontract amount	String
Estimated Beginning and Completion Date	Date

275-020-44 O.J.T. monthly time report equipment maintenance technician

Table A-68 O.J.T. monthly time report equipment maintenance technician data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of various equipment	Integer
Understanding basic function and preparation of eq.	Integer
Observation of tools in use	Integer
Care and Maintenance	
Safety procedures	Integer
Storage, care of, transportation, and use of seq.	Integer
Types and sizes of tools required	Integer
Preventive/Corrective Maintenance Techniques	
Safety procedures	Integer
Shop procedures - Fixed and mobile equipment	Integer
Tool requirements for fixed and mobile equipment	Integer
Field Procedures – Fixed and mobile equipment	Integer
Assistance in Maintenance Procedures	
Safety procedures	Integer
Selecting and assembling tools for job – fixed	Integer
Setting up and providing tools for job – fixed	Integer
Supply and Procurement Procedures (Parts and Tools)	
Understanding company purchase, receipt,	Integer

Learning key parts required	Integer
Observing methods of ordering, receiving, storing	Integer
Understanding use of parts catalog and cost of parts	Integer
Ordering, receiving, reporting, storing and drawing	Integer
Shop functions	
Safety procedures	Integer
Lubrication – oil, air, and fuel filtration grease	Integer
Paint and Body – body work and paint tint proced.	Integer
Familiarization – welding and burning equipment	Integer
Engines and Power Trains	
Safety procedures	Integer
Injector governor-the operation of service of...	Integer
Water cooled engine rebuild – assist in the ...	Integer
Transmissions and rear ends – assist in the...	Integer
Air cooled engines – assist in the complete...	Integer
Starters, generators, and voltage regulators...	Integer
Application of Training	
Orders, receives, and stores tools and equipment...	Integer
Uses tools of trade at direction and under ...	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-45 O.J.T. monthly time report - Motor grader operator

Table A-69 O.J.T. monthly time report - Motor grader operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of machine in operation	Integer
Starting, manipulating levers for moving equip...	Integer
Care and Maintenance	
Safety procedures	Integer

Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safe operating procedures	Integer
Scraping and leveling dirt on roadway	Integer
Spreading and mixing materials on roadway	Integer
Shaping and blading subgrades	Integer
Balancing and rough shaping base course materials	Integer
Fine Grading Operations (Fine Grade Only)	
Understanding grading plan requirements and...	Integer
Operation of equipment to fine grade specifications	Integer
Fine grading horizontal surfaces, shoulders and...	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-46 O.J.T. monthly time report - Milling machine operator

Table A-70 O.J.T. monthly time report - Milling machine operator data inventory

<u>Label on form</u>	<u>Data type</u>
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of machine in operation	Integer
Starting, manipulating vehicle	Integer
Care and Maintenance	
Safety Procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safety operating procedures	Integer
Milling, texturizing of existing surface and...	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-47 O.J.T. monthly time report- Concrete paving finishing machine operator

Table A-71 O.J.T. monthly time report- Concrete paving finishing machine operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of machine in operation	Integer
Starting and manipulating levers for moving...	Integer
Care and Maintenance	
Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safety operating procedures	Integer
Screed regulation indoctrination and operation	Integer
Operation of machine	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-48 O.J.T. monthly time report- Concrete paving machine/spreader operator

Table A-72 O.J.T. monthly time report- Concrete paving machine/spreader operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String

Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of machine in operation	Integer
Starting, Stopping, and manipulating levers for...	Integer
Care and Maintenance	
Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safety operating procedures	Integer
Screed regulation indoctrination and operation	Integer
Operation of machine	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-49 O.J.T. monthly time report - Deckhand

Table A-73 O.J.T. monthly time report - Deckhand data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of overall dredge operation	Integer
Care and Maintenance	
Safety procedures	Integer
Routine procedure for handling ropes and cable	Integer
Routine procedure for mooring tugs, barges...	Integer

Routine procedure for adding and removing...	Integer
Routine procedures for good housekeeping...	Integer
Routine procedure for removal of pump...	Integer
Total hours (min/max)	String
Performance of trainee	String/Code List

275-020-51 O.J.T. monthly time report - Mechanic

Table A-74 O.J.T. monthly time report - Mechanic data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Lubrication requirements of mechanical equip...,	Integer
Materials selection. familiarization with parts...	Integer
Machine shop familiarization. welding and...	Integer
Applied Techniques of the Mechanic	
Safety procedures	Integer
Equipment characteristics and lubrication points	Integer
Oil changes, filter changes, grease guns, hard...	Integer
Minor adjustments to drive chains and clutches...	Integer
Shop and Field Practices	
Shop/Field procedures - assist in the repair...	Integer
Paint & Body – Body work and painting procedures	Integer
Water/Air cooled engines – Assist in the...	Integer
Transmissions and rear ends – Assist in the...	Integer.
Equipment Operations and Operation of Oil...	
Safety procedures	Integer
Equipment Maintenance: Engines, fuel systems...	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-58 O.J.T. monthly time report - Truck driver**Table A-75 O.J.T. monthly time report - Truck driver data inventory**

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of vehicle in operation	Integer
Starting and manipulating vehicle	Integer
Care and Maintenance	
Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safety operating procedures	Integer
Loading and unloading materials and operation...	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-60 O.J.T. monthly time report - Tractor operator**Table A-76 O.J.T. monthly time report - Tractor operator data inventory**

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer

Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of vehicle in operation	Integer
Starting and manipulating levers for moving...	Integer
Care and Maintenance	
Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Safety operating procedures	Integer
Pulling compaction and mixing implements	Integer
Pushing other equipment to aid in loading...	Integer
Ground clearing assistance	Integer
Total hours (min/max)	Integer
Performance of trainee	String/Code List

275-020-64 O.J.T. monthly time report - Stone and aggregate spreader operator

Table A-77 O.J.T. monthly time report - Stone and aggregate spreader operator data inventory

Label on form	Data type
TAGS	
Name of company	String
Financial project no	String
FAP no	String
County	String
Name of trainee	String
Soc. sec. no.	String
Rate of pay	Double
Month ending	Integer
Instructor	String
Contractor work day	Integer
Training classification code	Integer/Code List
DATA	
Orientation and Safe Use of the Tools of the Trade	
Safety procedures	Integer
Observation of vehicle in operation	Integer
Starting and manipulating vehicle	Integer
Care and Maintenance	
Safety procedures	Integer
Routine fueling, lubricating and servicing	Integer
Actual Operation of Equipment	
Selection and loading of materials	Integer
Spreading of stone or other granular materials...	Integer

Total hours (min/max)	Integer
Performance of trainee	String/Code List

675-010-03 Concrete design mix

Table A-78 Concrete design mix form data inventory

Label on form	Data type
TAGS	
Approved	Boolean
Reviewed	Boolean
Date	Date
Mix no	String
Concrete supplier	String
Address	Address
Plant location	String
Telephone no	String
FDOT assigned plant no.	String/Code List
Project ID	String
DATA	
Slip form	Boolean
Hot weather	Boolean
Concrete class	String/Code List
Coarse aggregate Grade S.G. (SSD)	Double
Fine aggregate Grade S.G. (SSD)	Double
Pit no (Coarse) F.M. S.G. (SSD)	String/Code List
Pit no (Coarse) Type	String/Code List
Pit no (Fine) Type	String/Code List
Cement Type	String/Code List
Air entr admix Spec	String/Code List
Admixture Spec	String/Code List
Admixture Spec	String/Code List
Admixture Spec	String/Code List
Pozzolan Spec	String/Code List
Pozzolan Spec	String/Code List
Slag Spec	String/Code List
Slag Spec	String/Code List
Cement (lbs)	gml:MeasureType
Coarse aggregate (lbs)	gml:MeasureType
Fine aggregate (lbs)	gml:MeasureType
Air ent admix (oz)	gml:MeasureType
Admixture (oz)	gml:MeasureType
Admixture (oz)	gml:MeasureType
Admixture (oz)	gml:MeasureType
Water (gals)	gml:MeasureType
Water (lbs)	gml:MeasureType

Pozzolan (lbs)	gml:MeasureType
Pozzolan (lbs)	gml:MeasureType
Slag (lbs)	gml:MeasureType
Agg corr factor	Double
Slump range (in) to	gml:MeasureType
Air content (%) to	Double
Theo unit weight (Wet) (PCF)	gml:MeasureType
W/CM ratio (Plant) (lbs/lb)	gml:MeasureType
W/CM ratio (Field) (lbs/lb)	gml:MeasureType
Theo yield (CU FT)	gml:MeasureType
Water in silica fume (lbs)	gml:MeasureType
Water in corrosion inhib (lbs)	gml:MeasureType
Water in HRWR (lbs)	gml:MeasureType
Solids in silica fume (lbs)	gml:MeasureType
Lab test data	String
Chloride (lb/cy)	gml:MeasureType
Slump (in)	gml:MeasureType
Air Content (%)	Double
Compressive Strength (PSI)	
Day	gml:MeasureType

675-020-22 Density log book

Table A-79 Density log book data inventory

Label on form	Data type
TAGS	
F.A.P. no	String
FIN. no.	String
Contract no	String
County	String
Road no	String
Resident engineer	String
Date	Date
District materials engineer	String
Date	Date
DATA	
Density log sheets	String
Quality Assurance Density Inspectors	
Gauge	String
Cal.date	Date
Name	String
Initials	String

Title	String
Deit #	Integer
Date Begun	Date
Date Ended	Date
Monthly Inspections By Project Engineer	
Date	Date
Comments	String
Signature	String
Inspections By Independent Assurance Density Inspector	
Date	Date
Comments	String
Signature	String
Acceptance Proctors Embankment	
Sample no.	Integer
Date sampled	Date
Date received	Date
Area represented	String
Material description	String
Density PCF(kg/m3)	gml:MeasureType
Opt. moisture %	Double
Acceptance Proctors Subgrade	
Sample no.	Integer
Date sampled	Date
Date received	Date
Area represented	String
Material description	String
Density PCF(kg/m3)	gml:MeasureType
Opt. moisture %	Double
Acceptance Proctors Base	
Sample no.	Integer
Date sampled	Date
Date received	Date
Area represented	String
Material description	String
Density PCF(kg/m3)	gml:MeasureType
Opt. moisture %	Double
Independent Acceptance Proctors Embankment	
Sample no	String
Date sampled	Date
Date received	Date
Sample station & roadway	Station
Material description	String
I.A.Proctor	
Dry density PCF(kg/m3)	gml:MeasureType
Opt. moisture %	Double
Acceptance Proctor	

Dry density PCF(kg/m3)	gml:MeasureType
Opt. moisture %	Double
Independent Acceptance Proctors Subgrade	
Sample no.	String
Date sampled	Date
Date received	Date
Sample station & roadway	Station
Material description	String
I.A.Proctor	
Dry density PCF(kg/m3)	gml:MeasureType
Opt. moisture %	Double
Acceptance Proctor	
Dry density PCF(kg/m3)	gml:MeasureType
Opt. moisture %	Double
Independent Acceptance Proctors Base	
Independent Acceptance Proctors Subgrade	
Sample no.	String
Date sampled	Date
Date received	Date
Sample station & roadway	Station
Material description	String
I.A.Proctor	
Dry density PCF(kg/m3)	gml:MeasureType
Opt. moisture %	Double
Acceptance Proctor	
Dry density PCF(kg/m3)	gml:MeasureType
Opt. moisture %	Double
Special provisions and/or special requirements	String

Data Dictionary of Initially Studied Forms

Table A-80 Data dictionary of initially studied forms

Schema Group	Data Group	Label on the Form	Element name	Document	Definition	Example	Unit Type	Data Type
tags	tags			700-010-84 700-010-86 700-010-89 700-010-91	Tags that are used to identify the data			fdot:DefinitionTagsType
tags	tags	Project Name	projectName	700-010-84 700-010-86 700-010-89 700-010-91	Name of the project	Bridge construction	NA	string
tags	tags	FIN Project No.	FINProjectNo	700-010-84 700-010-86 700-010-89 700-010-91	Financial project number	ab12345cd	NA	string
tags	tags	Contractor	contractor	700-010-84 700-010-86 700-010-89 700-010-91	Name of the contractor	John Doe	NA	string
tags	tags	Inspected By	inspectedBy	700-010-84 700-010-86 700-010-89 700-010-91	Name of the inspector	John Doe	NA	string
tags	tags	Date	date	700-010-84 700-010-86 700-010-89 700-010-91	Date of the inspection	10-10-1999	NA	date
tags	tags	Approved By	approvedBy	700-010-84 700-010-86 700-010-89 700-010-91	Name of the approver	John Doe	NA	string
tags	tags	Date	date	700-010-84 700-010-86 700-010-89 700-010-91	Date of approval	10-10-1998	NA	date

tags	tags	Page	page	700-010-84 700-010-86 700-010-89 700-010-91	Page number	12	NA	integer
tags	tags	Pier No	pierNo.	700-010-84 700-010-86 700-010-89 700-010-91	Pier number	a12	NA	string
tags	tags	Shaft No	shaftNo	700-010-84 700-010-86 700-010-89 700-010-91	Shaft number	121	NA	string
tags	tags	Station	station	700-010-84 700-010-86 700-010-89 700-010-91	Station name	156+00	NA	string
tags	tags	Offset	offset	700-010-84 700-010-86 700-010-89 700-010-91	Offset distance	12	ft/m	gml:Measu reType
drilledSha ftLog	drilledSha ftLog			700-010-84	Data concernin g drilled shaft constructi on			fdot:Drillin gLogType
drilledSha ftLog	drilledSha ftLog		tags	700-010-84 700-010-86 700-010-89	Tags that are used to identify the data			fdot:Defini tionTagsT ype
drilledSha ftLog	drilledSha ftLog	ID	innerDiameter OfCasing	700-010-84	Inner diametr of circular casing	10	in/mm	gml:Measu reType

drilledShaftLog	drilledShaftLog	OD	outerDiameterOfCasing	700-010-84	Outer diameter of circular casing	15	in/mm	gml:MeasureType
drilledShaftLog	drilledShaftLog	Length	lengthOfCasing	700-010-84	Casing length	23	ft/m	gml:MeasureType
drilledShaftLog	drilledShaftLog	Type	typeOfCasing	700-010-84	Casing type		NA	string/codelist
drilledShaftLog	drilledShaftLog	Top Elev.	topElevationOfCasing	700-010-84	Elevation of the top of the casing		NA	gml:MeasureType
drilledShaftLog	drilledShaftLog	Bot. Elev.	bottomElevationOfCasing	700-010-84	Elevation of the bottom of the casing		NA	gml:MeasureType
drilledShaftLog	drilledShaftLog		drillingIncrement	700-010-84	Incremental soil analysis data		NA	fdot:DrillingIncrementType
drilledShaftLog	drilledShaftLog	Date Opened	dateOpened	700-010-84	The date the hole is opened	10-10-1999	NA	date
drilledShaftLog	drilledShaftLog	Date Cased	dateCased	700-010-84	The date casing is placed	10-10-1999	NA	date

drilledShaftLog	drilledShaftLog	Date Poured	datePoured	700-010-84	The date hole is closed	10-10-1999	NA	date
drilledShaftLog	drilledShaftLog		drilledShaftConstructionElevations	700-010-84	Elevation information specific to drilled shaft construction		NA	fdot:DrilledShaftConstructionElevations
drilledShaftLog	drilledShaftLog		drilledShaftConstructionDimensions	700-010-84	Dimensions of drilled shaft construction		NA	fdot:DrilledShaftConstructionDimensions
drilledShaftLog	drilledShaftLog		drilledShaftConstructionConcreteVolume	700-010-84	Details of concrete volume for drilled shaft construction		NA	fdot:DrilledShaftConstructionConcreteVolumeType
drilledShaftLog	drilledShaftLog		drilledCastShaftConstructionRebarCageCheckList	700-010-84	Check list of the rebar cage details		NA	fdot:DrilledCastShaftConstructionRebarCageCheckListType
drilledShaftLog	drilledShaftLog		drilledCastShaftConstructionDetails	700-010-84	Details of drilled cast shaft construction		NA	fdot:DrilledCastShaftConstructionDetailsPropertyType
drilledShaftLog	drilledShaftLog	Comments	comments	700-010-84	Notes about the work items	12.5	NA	string
drilledShaftLog	drillingIncrement				Incremental soil analysis data			fdot:DrillingIncrementType

drilledShaftLog	drillingIncrement	Depth	depth	700-010-84	Depth of penetration from ground surface	15	ft'm	gml:MeasureType
drilledShaftLog	drillingIncrement	Time in	timeIn	700-010-84	Time penetration started	12:12:21	NA	time
drilledShaftLog	drillingIncrement	Time Out	timeOut	700-010-84	Time penetration finished	12:12:22	NA	time
drilledShaftLog	drillingIncrement	Elevation	elevation	700-010-84	Elevation of the bottom of the drilled section	100	ft'm	gml:MeasureType
drilledShaftLog	drillingIncrement	Soil Auger Diameter	soilAugerDiameter	700-010-84	Diameter of the soil auger, in case continuous flight auger is used for drilling	20	ft'm	gml:MeasureType
drilledShaftLog	drillingIncrement	Soil Description & Notes	soilDescriptionAndNotes	700-010-84	The results of soil type analysis		NA	string
drilledShaftLog	drilledShaftConstructionElevations			700-010-84	Elevation information specific to drilled shaft construction			fdot:DrilledShaftConstructionElevations
drilledShaftLog	drilledShaftConstructionElevations	Reference Elevation	referenceElevation	700-010-84	Elevation used as reference for other elevation values	125	ft'm	gml:MeasureType

drilledShaftLog	drilledShaftConstructionElevations	Ground Surface Elevation	groundSurfaceElevation	700-010-84	Elevation of ground surface	100	ft/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionElevations	Water Table Elevation	waterTableElevation	700-010-84	Elevation of water table	101	ft/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionElevations	Cutoff Elevation	cutOffElevation	700-010-84	cutOffElevation	102	ft/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionElevations	Tip Elevation	tipElevation	700-010-84	Elevation of the tip of the pile	103	ft/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionDimensions				Dimensions of drilled shaft construction			fdot:DrilledShaftConstructionDimensions
drilledShaftLog	drilledShaftConstructionDimensions	Diameter of Rock Socket	diameterOfRockSocket	700-010-84	Diameter of the pile section in the rock	105	ft/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionDimensions	Rock Socket Length	rockSocketLength	700-010-84	Length of the pile section in the rock	106	ft/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionDimensions	Diameter of Overburden Shaft	diameterOfOverburdenShaft	700-010-84	Diameter of the shaft on the surface	107	ft/m	gml:MeasureType

drilledShaftLog	drilledShaftConstructionDimensions	Overburden Shaft Length	overBurdenShaftLength	700-010-84	Length of the shaft on the surface	108	ft/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionDimensions	Constructed Shaft Length	constructedShaftLength	700-010-84	Total length of the shaft	109	ft/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionConcreteVolume				Details of concrete volume for drilled shaft construction			fdot:DrilledShaftConstructionConcreteVolumeType
drilledShaftLog	drilledShaftConstructionConcreteVolume	Theoretical	theoretical	700-010-84	Theoretical concrete of volume to be placed	111	cy/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionConcreteVolume	Actual	actual	700-010-84	Actual concrete volume placed	112	cy/m	gml:MeasureType
drilledShaftLog	drilledShaftConstructionConcreteVolume	Ratio	ratio	700-010-84	Ratio of actual volume to theoretical volume	113	NA	double
drilledShaftLog	drilledCastShaftConstructionRebarCageCheckList				Check list of the rebar cage details			fdot:DrilledCastShaftConstructionRebarCageCheckListType
drilledShaftLog	drilledCastShaftConstructionRebarCageCheckList	Proper # Vert. Bars	properVerticalBars	700-010-84	Data about the proper number of vertical bars	FALSE	NA	boolean

drilledShaftLog	drilledCastShaftConstructionRebarCageCheckList	Proper # Horz. Bars	properHorizontalBars	700-010-84	Data about the proper number of horizontal bars	TRUE	NA	boolean
drilledShaftLog	drilledCastShaftConstructionRebarCageCheckList	Side Standoffs	sideStandoffs	700-010-84	Data about the proper side standoffs	FALSE	NA	boolean
drilledShaftLog	drilledCastShaftConstructionRebarCageCheckList	Epoxy Condition	epoxyConditions	700-010-84	Data about the proper epoxy conditions	TRUE	NA	boolean
drilledShaftLog	drilledCastShaftConstructionRebarCageCheckList	Ties & Connections	tiesAndConnections	700-010-84	Data about the proper ties and connections	FALSE	NA	boolean
drilledShaftLog	drilledCastShaftConstructionDetails			700-010-84	Details of drilled cast shaft construction			fdot:DrilledCastShaftConstructionDetailsPropertyType
drilledShaftLog	drilledCastShaftConstructionDetails	Type	drillingMudType	700-010-84	Type of the mud used in drilling		NA	string/codelist
drilledShaftLog	drilledCastShaftConstructionDetails	Test Results	testResults	700-010-84	Lab test results for drilling mud		NA	string/codelist
drilledShaftLog	drilledCastShaftConstructionDetails	Meet specifications?	meetSpecifications	700-010-84	Data whether the drilling mud meets specs or not	FALSE	NA	boolean

drilledShaftLog	drilledCastShaftConstructionDetails	Bottom Cleanout Method	bottomCleanoutMethod	700-010-84	Method used to clean the bottom of drilled hole		NA	string/codelist
drilledShaftLog	drilledCastShaftConstructionDetails	Time and Date of Final Clearance	timeAndDateOfFinalClearance	700-010-84	time and date of the bottom clean out	12-12-1999 T12:12:12	NA	dateTime
drilledShaftLog	drilledCastShaftConstructionDetails	Inspection Type	inspectionType	700-010-84	Shaft bottom inspection type	Visual Sounding	NA	string/codelist
drilledShaftLog	drilledCastShaftConstructionDetails	Time Started	timeBottomCheckStarted	700-010-84	Finish time of the bottom check	12:12:12	NA	time
drilledShaftLog	drilledCastShaftConstructionDetails	Time Finished	timeBottomCheckFinished	700-010-84	Start time of the bottom check	12:12:12	NA	time
drilledShaftLog	drilledCastShaftConstructionDetails	Avg. Shaft Bottom Elev.	averageShaftBottomElevation	700-010-84	Average of the five elevation values obtained from 5 sides of finished shaft bottom	125	ft'm	gml:MeasureType
drilledShaftLog	drilledCastShaftConstructionDetails	Est. Shaft Diameter	estimatedShaftDiameter	700-010-84	Estimated diameter of shaft	100	ft'm	gml:MeasureType

APPENDIX B

SUPPORTING APPLICATION OUTLINES

Bridge 39005 CR229 over New River	Pile Number	Test Pile Length	Production Length	Preform Length	Prod Total To- Date (LF)	Date Delivered	Delivery Ticket	Furnish Invoice #	Ship Invoice #
End Bent 1	1	-	40	0	45	1/4/2007	34347	10459829Q	10462829Q
End Bent 1	2	-	40	0	45	1/4/2007	34348	10459829Q	10462829Q
End Bent 1	3	-	40	0	45	1/4/2007	34349	10459829Q	10462829Q
End Bent 1	4	-	40	0	45	1/4/2007	34350	10459829Q	10462829Q
End Bent 1	5	-	40	0	45	1/4/2007	34351	10459829Q	10462829Q
End Bent 1	6	-	40	0	45	1/4/2007	34352	10459829Q	10462829Q
End Bent 1	7	-	40	0	45	1/4/2007	34353	10459829Q	10462829Q
End Bent 1	8	-	40	0	45	1/4/2007	34354	10459829Q	10462829Q
Bent 2	1		85	65	109.5	3/29/2007	35104	10427829Q	10863829Q
Bent 2	2	100			5	12/20/2006	34311	10427829Q	10863829Q
Bent 2	3		85	65	109.5	3/29/2007	35105	10427829Q	10863829Q
Bent 2	4		85	65	109.5	3/29/2007	35106	10427829Q	10863829Q
Bent 2	5		85	65	109.5	3/29/2007	35107	10427829Q	10863829Q
Bent 2	6		85	65	109.5	3/29/2007	35108	10427829Q	10863829Q
Bent 2	7		85	65	109.5	3/29/2007	35109	10427829Q	10863829Q
Bent 3	1		85	65	109.5	3/26/2007	35068	10528829Q	10864829Q
Bent 3	2		85	65	109.5	3/26/2007	35069	10528829Q	10864829Q
Bent 3	3		85	65	109.5	3/26/2007	35070	10528829Q	10864829Q
Bent 3	4		85	65	109.5	3/26/2007	35071	10528829Q	10864829Q
Bent 3	5		85	65	109.5	3/26/2007	35072	10528829Q	10864829Q
Bent 3	6		85	65	109.5	3/26/2007	35073	10528829Q	10864829Q
Bent 3	7		85	65	109.5	3/26/2007	35074	10528829Q	10864829Q
Bent 4	1		85	65	109.5	3/14/2007	34993	10657829Q	10789829Q
Bent 4	2		85	65	109.5	3/14/2007	34994	10657829Q	10789829Q
Bent 4	3	100			5	12/7/2006	34223	10232829Q	10343829Q
Bent 4	4		85	65	109.5	3/14/2007	34995	10657829Q	10789829Q
Bent 4	5		85	65	109.5	3/15/2007	35000	10657829Q	10789829Q
Bent 4	6		85	65	109.5	3/15/2007	35001	10657829Q	10789829Q
Bent 4	7		85	65	109.5	3/15/2007	35002	10657829Q	10789829Q
Bent 5	1		85	65	109.5	4/18/2007	35240	10998829Q	11009829Q
Bent 5	2		85	65	109.5	4/23/2007	35289	11052829Q	11052829Q
Bent 5	3		85	65	109.5	4/23/2007	35290	11051829Q	11060829Q
Bent 5	4		85	65	109.5	4/23/2007	35291	11051829Q	11060829Q
Bent 5	5		85	65	109.5	4/23/2007	35292	11051829Q	11060829Q
Bent 5	6		85	65	109.5	4/23/2007	35293	11051829Q	11060829Q
Bent 5	7		85	65	109.5	4/23/2007	35294	11051829Q	11060829Q
Bent 6	1	100			5	12/4/2006	34186	10232829Q	10343829Q
Bent 6	2		85	65	109.5	4/18/2007	35235	10998829Q	10998829Q
Bent 6	3		85	65	109.5	4/18/2007	35236	10998829Q	10998829Q
Bent 6	4	100			0	9/26/2006	33649	10039829Q	10041829Q
Bent 6	5		85	65	109.5	4/18/2007	35237	10998829Q	11009829Q
Bent 6	6		85	65	109.5	4/18/2007	35238	10998829Q	11009829Q
Bent 6	7		85	65	109.5	4/18/2007	35239	10998829Q	11009829Q
Bent 7	1		85	65	109.5	4/23/2007	35295	11052829Q	11052829Q
Bent 7	2		85	65	109.5	4/25/2007	35317	11051829Q	11060829Q
Bent 7	3		85	65	109.5	4/25/2007	35318	11051829Q	11060829Q
Bent 7	4		85	65	109.5	4/25/2007	35319	11051829Q	11060829Q
Bent 7	5		85	65	109.5	4/25/2007	35320	11052829Q	11052829Q
Bent 7	6		85	65	109.5	4/25/2007	35321	11052829Q	11052829Q
Bent 7	7		85	65	109.5	4/26/2007	35332	11052829Q	11052829Q

Figure B-3 Original piling quantities form-pay item reconciliation

206050 Pile Purchase Reconciliation

SHIPPING		Total					Total	Amt Paid	Balance	Invoice #
Location/Type	Pile Length	# Piles	Length	Rate	Ext	Tax				
B2 Test Pile	100	1	100	\$17.00	\$ 1,700.00	\$ -	\$ 1,700.00	\$ 1,700.00	\$ -	10407289Q
B4 Test Pile	100	1	100	\$17.00	\$ 1,700.00	\$ -	\$ 1,700.00	\$ 1,700.00	\$ -	10343829Q
B6 Test Pile 1	100	1	100	\$17.00	\$ 1,700.00	\$ -	\$ 1,700.00	\$ 1,700.00	\$ -	10041829Q
B6 Test Pile 2	100	1	100	\$17.00	\$ 1,700.00	\$ -	\$ 1,700.00	\$ 1,700.00	\$ -	10343829Q
End Bent 8 Test Pile	60	1	60	\$17.00	\$ 1,020.00	\$ -	\$ 1,020.00	\$ 1,020.00	\$ -	10041829Q
End Bent 1	40	8	320	\$17.00	\$ 5,440.00	\$ -	\$ 5,440.00	\$ 5,440.00	\$ -	10462829Q
Bent 2	85	6	510	\$17.00	\$ 8,670.00	\$ -	\$ 8,670.00	\$ 9,120.20	\$ (450.20)	10863829Q
Bent 3	85	7	595	\$17.00	\$ 10,115.00	\$ -	\$ 10,115.00	\$ 10,721.98	\$ (606.98)	10864829Q
Bent 4	85	6	510	\$17.00	\$ 8,670.00	\$ -	\$ 8,670.00	\$ 8,670.00	\$ -	10789829Q
			0	\$17.00	\$ -	\$ -	\$ -	\$ 9,120.20	\$ (9,120.20)	
Bent 5	85	1	85	\$17.00	\$ 1,445.00	\$ -	\$ 1,445.00	\$ 1,445.00	\$ -	11009829Q
	85	5	425	\$17.00	\$ 7,225.00	\$ -	\$ 7,225.00	\$ 7,225.00	\$ -	11060829Q
	85	1	85	\$17.00	\$ 1,445.00	\$ -	\$ 1,445.00	\$ 1,445.00	\$ -	11052829Q
Bent 6	85	2	170	\$17.00	\$ 2,890.00	\$ -	\$ 2,890.00	\$ 2,890.00	\$ -	10999829Q
	85	3	255	\$17.00	\$ 4,335.00	\$ -	\$ 4,335.00	\$ 4,335.00	\$ -	10998829Q
Bent 7	85	3	255	\$17.00	\$ 4,335.00	\$ -	\$ 4,335.00	\$ 4,335.00	\$ -	11060829Q
	85	3	255	\$17.00	\$ 4,335.00	\$ -	\$ 4,335.00	\$ 4,335.00	\$ -	11052829Q
	90	1	90	\$17.00	\$ 1,530.00	\$ -	\$ 1,530.00	\$ 1,530.00	\$ -	11052829Q
End Bent 8	42	7	294	\$17.00	\$ 4,998.00	\$ -	\$ 4,998.00	\$ 4,998.00	\$ -	10374829Q
Furnish Material										
B2 Test Pile	100	1	100	\$76.25	\$ 7,625.00	\$ 457.50	\$ 8,082.50	\$ 8,082.50	\$ -	10402829Q
B4 Test Pile	100	1	100	\$76.25	\$ 7,625.00	\$ 457.50	\$ 8,082.50	\$ 8,082.50	\$ -	102322829Q
B6 Test Pile 1	100	1	100	\$76.25	\$ 7,625.00	\$ 457.50	\$ 8,082.50	\$ 8,082.50	\$ -	10232829Q
B6 Test Pile 2	100	1	100	\$76.25	\$ 7,625.00	\$ 457.50	\$ 8,082.50	\$ 8,082.50	\$ -	10039829Q
End Bent 8 Test Pile	60	1	60	\$76.25	\$ 4,575.00	\$ 274.50	\$ 4,849.50	\$ 4,849.50	\$ -	10039829Q
End Bent 1	40	8	320	\$76.25	\$ 24,400.00	\$ 1,464.00	\$ 25,864.00	\$ 25,864.00	\$ -	10452929Q
Bent 2	85	6	510	\$76.25	\$ 38,887.50	\$ 2,333.25	\$ 41,220.75	\$ 41,220.75	\$ -	10427829Q
Bent 3	85	7	595	\$76.25	\$ 45,368.75	\$ 2,722.13	\$ 48,090.88	\$ 48,090.88	\$ (0.00)	10528829Q
Bent 4	85	6	510	\$76.25	\$ 38,887.50	\$ 2,333.25	\$ 41,220.75	\$ 41,220.75	\$ -	10657829Q
Bent 5	85	1	85	\$76.25	\$ 6,481.25	\$ 388.88	\$ 6,870.13	\$ 6,870.13	\$ (0.01)	10998259Q
	85	5	425	\$76.25	\$ 32,406.25	\$ 1,944.38	\$ 34,350.63	\$ 34,350.63	\$ -	11051829Q
	85	1	85	\$76.25	\$ 6,481.25	\$ 388.88	\$ 6,870.13		\$ 6,870.13	

Figure B-4 Original piling quantities form-invoice

**APPENDIX C SCHEMA RESEARCH DOCUMENTATION
(AVAILABLE UPON REQUEST)**

**APPENDIX D PAYROLL REPORTING APPLICATION
AND SUPPORTING DOCUMENTS (AVAILABLE UPON
REQUEST)**

**APPENDIX E PILE QUANTITIES APPLICATION
(AVAILABLE UPON REQUEST)**