


Strategies and Recommendations for Integrating Utility and Environmental Processes at TxDOT

Workshop Presentation


Research Project 0-6065
"Integrating Utility Conflict Elimination and Environmental Processes"



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Workshop Overview


- Project objectives and workshop materials
- Recommended strategies and changes to TxDOT manuals
- Break
- Introduction to TxDOT Business Process Explorer (TxBPE)
- TxBPE live demonstration
- General discussion and feedback



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Project Objectives

- Feasibility to obtain better utility data in the preliminary design phase
- Feasibility of earlier assessment of design elements in the preliminary design phase
- Identify potential business process changes
- Proposed changes to relevant TxDOT manuals
- Research dissemination/educational materials
- Swim lane diagram



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Research Team

TxDOT:

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- Duncan Stewart, RTI
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TTI:

- Cesar Quiroga (RS)
- Nick Koncz
- Edgar Kraus
- Jerry Le
- John Overman
- Duane Rosa, WTAMU

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Recommended Strategies

- 1) Involve environmental and ROW staff in planning and programming
- 2) Establish planning advisory teams and support tools
- 3) Coordinate environmental and ROW utility data collection
- 4) Enhance and coordinate preparation of scopes of services
- 5) Require utility owners to verify and certify utility facility information

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Recommended Strategies

- 6) Gather some Quality Level B (QLB) data during preliminary design phase
- 7) Include some drainage design elements in preliminary design phase
- 8) Include some design elements in preliminary design phase
- 9) Address utility issues in constructability review in preliminary design phase
- 10) Develop/update curricula for utility coordination stakeholders

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1) Involve Environmental/ROW Staff in Planning and Programming

- Purpose: Identify “fatal flaw” issues
 - ✓ Utilities, pipelines
 - ✓ Potential contamination sites
 - ✓ Sensitive receptors
- Preliminary feedback to advance planning
- Annual meeting with utilities
- Preliminary cost estimate
- Issue: Allocation of resources



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1) Involve Environmental/ROW Staff in Planning and Programming

- Potential changes to manuals
 - ✓ Project Development Process (PDP) Manual
 - » Add PDP activity for preliminary feedback to planning
 - ✓ Environmental Manual
 - » Informal feedback to Planning and Programming
 - ✓ ROW Utility Manual
 - » Provide input on utility-friendly project list
 - » Attend annual (utility) meeting
 - » Provide support for right of way estimate
 - » Attend Design Concept Conference (part of preliminary design)



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2) Establish Planning Advisory Teams and Support Tools

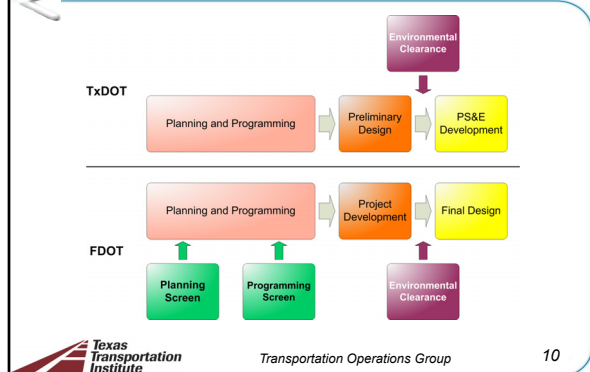
- Purpose: Use environmental data in transportation planning and programming
- Memoranda of Understanding (MOUs) with TCEQ, TPWD, THC, and GLO
- FDOT ETDM process
 - ✓ Environmental Technical Advisory Teams (ETAT)
 - ✓ Environmental Screening Tool (EST)
- Implement ETAT and EST
- Expand MOUs with resource agencies
- Cooperative Utility Planning System (CUPS)



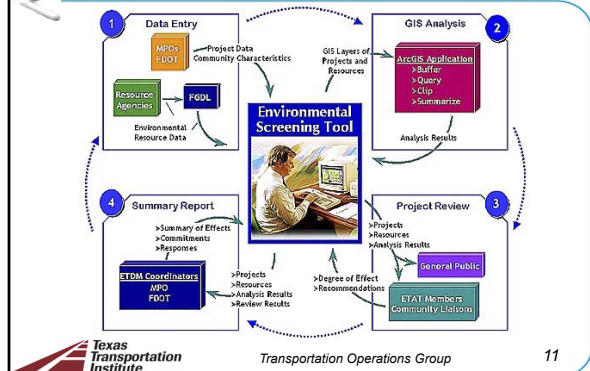
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2) Establish Planning Advisory Teams and Support Tools



2) Establish Planning Advisory Teams and Support Tools



2) Establish Planning Advisory Teams and Support Tools

• Potential changes to manuals

- ✓ **PDP Manual**
 - » PDP 3100 (Perform early coordination with review/resource agencies): Clarify "early coordination"
 - » New activities "Review planning screen data," "Review programming screen data"
- ✓ **Environmental Manual**
 - » Changes to chapters "Interagency Coordination" and "Permitting"
- ✓ **ROW Utility Manual**
 - » None

3) Coordinate Environmental/ROW Utility Data Collection

- Purpose: Improve coordination between groups regarding utility data collection activities
- Initial Site Assessments (ISA) vs. utility site investigations (QLD and QLC)
 - ✓ Surface observations
 - ✓ Review of existing records
- Start utility investigations concurrent with initial environmental site investigations
- Share investigation results



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3) Coordinate Environmental/ROW Utility Data Collection

- Potential changes to manuals
 - ✓ PDP Manual
 - » Add coordination activities
 - ✓ Environmental Manual
 - » Notify ROW of pending ISA initiation and completion
 - ✓ ROW Utility Manual
 - » Notify environmental staff of utility investigation and completion
 - ✓ Both Environmental and ROW Utility Manual
 - » Exchange results of investigation and relevant information
 - » Attend annual utility meeting



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4) Enhance and Coordinate Preparation of Scopes of Services

- Purpose: Identify utility facilities earlier, reduce redundancy, and reduce utility conflict impact
- Professional services (SUE) vs. scientific services (environmental)
- SUE: Design phase (QLB and QLA)
- Environmental work: Preliminary design phase
- Many consultants offer both services
- Identify scopes of services earlier




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4) Enhance and Coordinate Preparation of Scopes of Services

- Potential changes to manuals
 - ✓ **PDP Manual**
 - » Include scope of work coordination to PDP 1000 (Identify project need and scope) and PDP 2000 (Conduct Design Concept Conference)
 - ✓ **Environmental Manual**
 - » Include scope of work coordination
 - ✓ **ROW Utility Manual**
 - » Include scope of work coordination to "Exchange of Preliminary Information: Annual Meeting"




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5) Require Utility Owners to Verify and Certify Utility Facility Information

- Purpose: Increase quality of information from utility owners during preliminary design phase
- Utility owners mark up geometric schematics
- Request utility owner verification and certification
 - ✓ **Completeness of known records, ground markings**
- Use One Call during preliminary design phase
- Challenge: Include "Preliminary design locate ticket" in Texas Utilities Code



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Date

Agency Sponsor

Re: **Utility Verification Letter**
Project & Limits
CSJ/Project Number

Dear Agency Sponsor:

"X" utility company has provided the engineer with all of the known record utility information related to this project. As requested, all known inaccessible features have been excavated and paint markings have been provided for the engineer to locate and tie into the project control. "X" utility company has reviewed the submittal information and, to the extent possible, collaborated with the engineer in verifying and completing the utility mapping.

To the best of our knowledge and belief, the utility mapping accomplished to date is a reasonably accurate depiction of "X" utility company's facilities within the project area and can be used with reasonable confidence in the development of the project schematic.

Responsible Party Name & Title

District: San Antonio

Date: _____

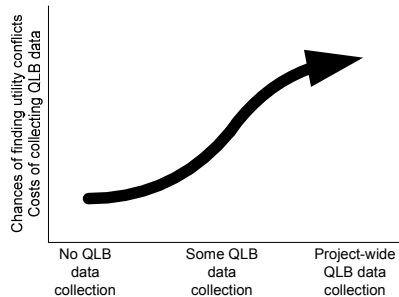
5) Require Utility Owners to Verify and Certify Utility Facility Information

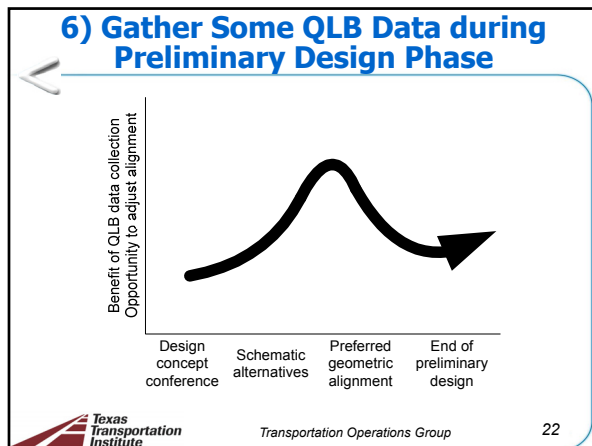
- Potential changes to manuals
 - ✓ **PDP Manual**
 - » New activity after QLD: "Verify major utility installations on project alternatives"
 - » New activity after preferred alternative: "Provide preliminary design locate ticket to One Call center"
 - » New activity after QLC: "Verify location of utility installations on preferred alternative." Include request for verification certification
 - ✓ **Environmental Manual**
 - » None
 - ✓ **ROW Utility Manual**
 - » None

6) Gather Some QLB Data during Preliminary Design Phase

- Purpose: Reduce uncertainty about underground utility facilities earlier in the PDP
- QLB completed in design phase (if done)
- Collect QLB data earlier if:
 - ✓ Right of way stays the same, e.g., for road widening or adding lanes within available space
 - ✓ Important to know utility locations
- Utilities do not favor private easements
- Issue: Costs vs. benefits

6) Gather Some QLB Data during Preliminary Design Phase





- ### 6) Gather Some QLB Data during Preliminary Design Phase
- Potential changes to manuals
 - ✓ **PDP Manual**
 - » Rename PDP 4200 as "Conduct QLB and QLA utility investigations"
 - » Reword PDP 4200 to eliminate confusion about locate, designate, and SUE
 - » Use SUE terminology consistent with American Society of Civil Engineering/Construction Institute (ASCE/CI) Standard 38-02
 - ✓ **Environmental Manual**
 - » None
 - ✓ **ROW Utility Manual**
 - » None
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- ### 7) Include Some Drainage Design Elements in Preliminary Design Phase
- Purpose: Encourage earlier participation by utilities
 - Many/most utility conflicts are drainage-related
 - Drainage design typically completed at 60% design
 - Approx. elevation, sizes of cross drainage structures
 - ✓ Sizing depends on district's time availability
 - ✓ Focus on preliminary calculations
 - Outfalls (must be cleared by environmental process)
 - Appropriate for cases where cross section is "stable"
 - High res/low altitude aerial photography can facilitate high accuracy vertical data in preliminary design
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- » None
Texas
Transportation
Institute

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[illegible]


8) Include Some Design Elements in Preliminary Design Phase

- Potential changes to manuals
 - ✓ **Roadway Design Manual**
 - » Update schematic layout requirements to include elements listed in PDP 2350
 - » Plan views: Add typical foundation footprints and depths
 - ✓ **PDP Manual**
 - » None (already provides refs. to Roadway Design Manual)
 - ✓ **Environmental Manual**
 - » None
 - ✓ **ROW Utility Manual**
 - » None


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9) Address Utility Issues in Constructability Review in Preliminary Design Phase

- Purpose: Include utilities in constructability review
- PDP 2670, National Cooperative Highway Research Program (NCHRP) 391 do not mention utility issues in constructability review
- Examples of utility issues
 - ✓ Impact of utilities on construction phasing
 - ✓ Trench section and protection
 - ✓ Temporary pole bracing
 - ✓ Utility conflicts


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9) Address Utility Issues in Constructability Review in Preliminary Design Phase

- Potential changes to manuals
 - ✓ **PDP Manual**
 - » Include references to utility issues in PDP 2670 "Conduct constructability review" such as:
 - Impact of utilities on construction phasing
 - Trench section and protection
 - Temporary pole bracing
 - Utility conflicts
 - ✓ **Environmental Manual**
 - » None
 - ✓ **ROW Utility Manual**
 - » Insert activity "Preliminary design utility coordination"


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10) Develop/Update Curricula for Utility Coordination Stakeholders

- Purpose: Improve quality of utility processes
- TxDOT: Utility conflicts course (2001)
- TxDOT: UIR training workshops
- GDOT: Utility conflict management
- Mn/DOT: Two-day course on new process
- NHI Course "Highway/Utility Issues"
- Recommendations from international scan
- SHRP 2 R15(A)



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TxDOT Manual Structure Recommendations

- Simplify project development process
- Harmonize/remove inconsistencies between manuals
 - ✓ Differences in activity descriptions
 - ✓ Inconsistencies in level of aggregation
 - ✓ Redundancy in content
 - ✓ Inconsistent flowcharts
 - ✓ Some manuals are modular, some are not
 - ✓ Some manuals use activity codes



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TxDOT Manual Structure Recommendations

- Proposed structure: PDP Manual becomes a "bookcase" with thematic shelves and individual volumes containing standardized TxDOT manuals



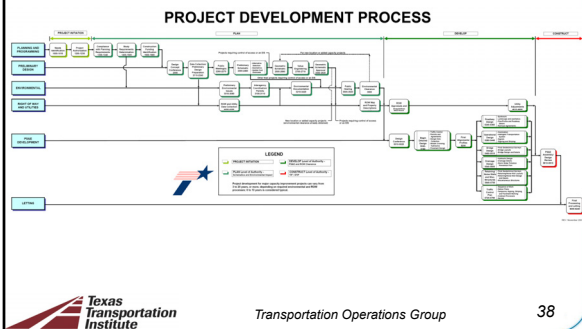
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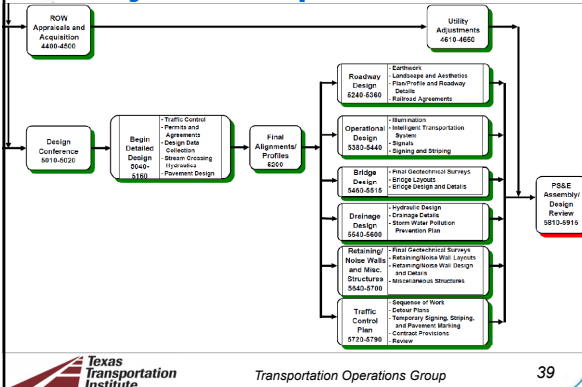
Business Process Modeling Approaches

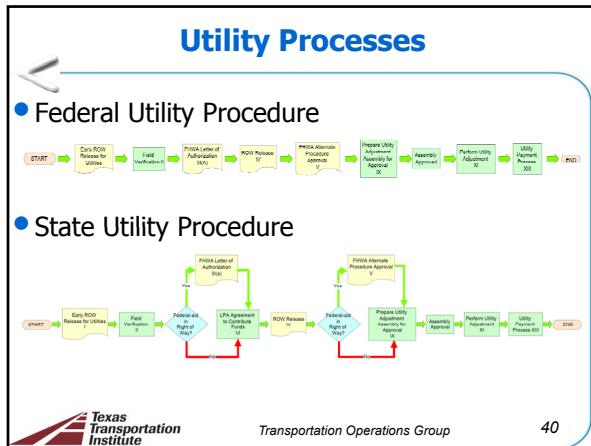
- Informal, ad hoc "flowcharting"
- Inconsistent, incompatible approaches across manuals
- Level of detail varies
- Typically high level
- Loose flowchart/manual mapping
- No TxDOT business process modeling standard

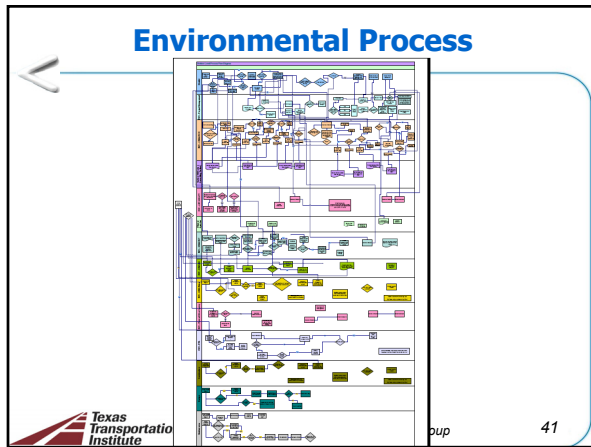
Project Development Process

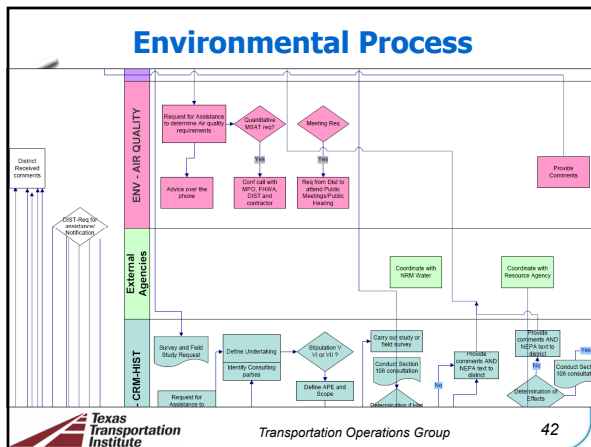


Project Development Process





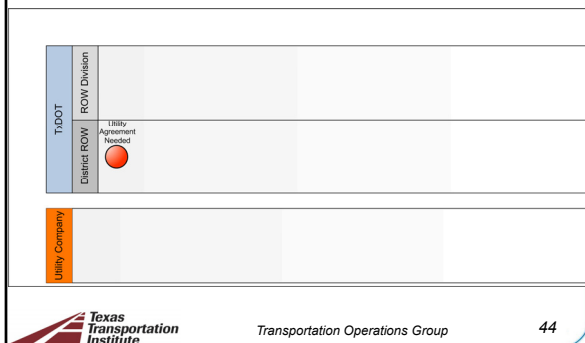




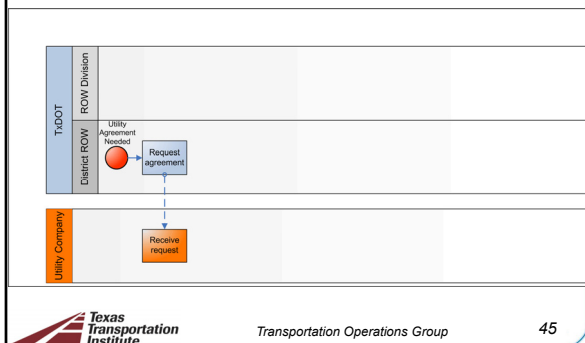
Introduction to TxBPE

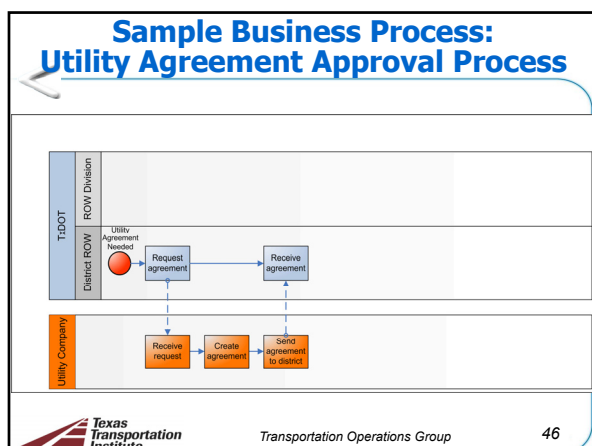
- TxDOT Business Process Explorer
- Purpose: Visualize and facilitate access to business process information
- 3-level structure
 - ✓ Level 1 (Overview BPM): **Activity Groups**
 - ✓ Level 2 (Detail BPM): **Activities**
 - ✓ Level 3 (links to manuals): **Activity Descriptions**

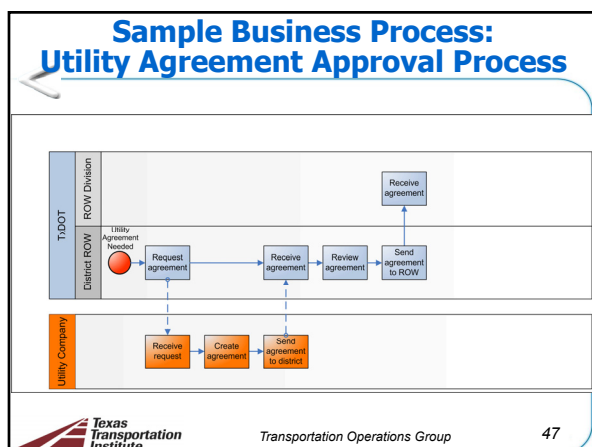
Sample Business Process: Utility Agreement Approval Process

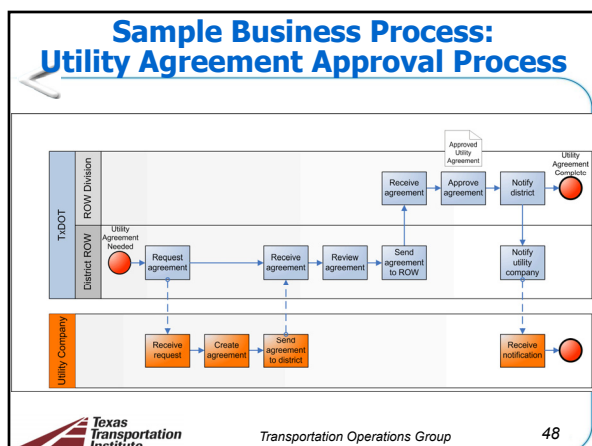


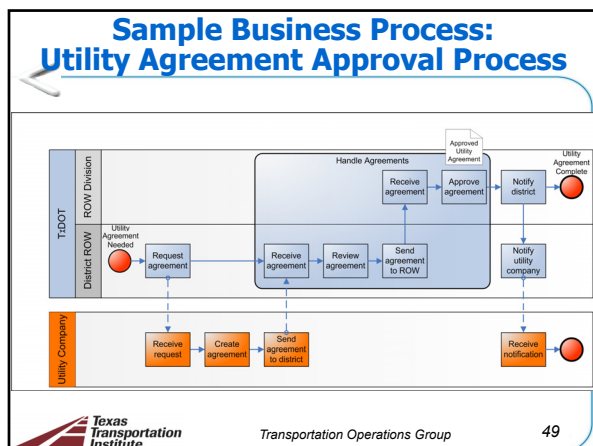
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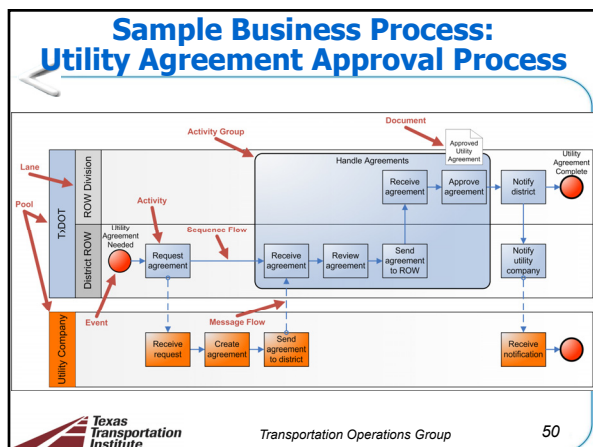


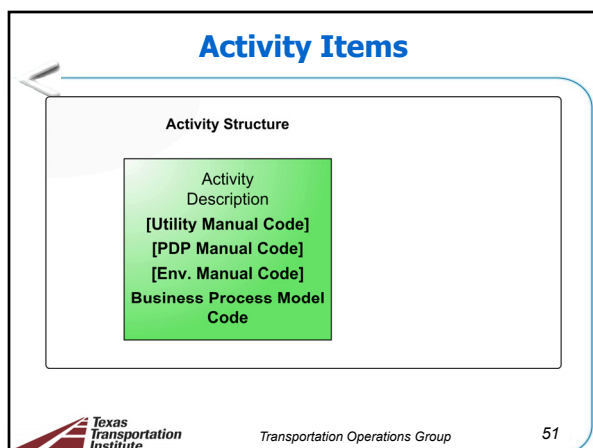












Activity Items

Activity Structure

Required
 As available
 Required

Activity Description

[Utility Manual Code]

[PDP Manual Code]

[Env. Manual Code]

Business Process Model Code

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Activity Items

Activity Structure

Required
 As available
 Required

Activity Description

[Utility Manual Code]

[PDP Manual Code]

[Env. Manual Code]

Business Process Model Code

Examples

Prepare purpose and need statement

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Activity Items

Activity Structure

Required
 As available
 Required

Activity Description

[Utility Manual Code]

[PDP Manual Code]

[Env. Manual Code]

Business Process Model Code

Examples

[UM PA 3]

Utility Manual
Process
Activity

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Activity Items

Activity Structure

Examples

[PDP 3240]
Project Development Task
Process Manual

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TxBPE Demo

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Discussion

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