

1.0 PURPOSE

Thorough research at the start and during the progress of the project will help avoid costly design changes later. The purpose of this procedure is to describe methods for identifying existing conditions at potential construction sites for new facilities and alterations of existing facilities.

2.0 SCOPE

This guideline helps designers identify and collect information and data needed to design and construct various transit facilities and guides reviewers as they check submittals for existing conditions. They are intended for all disciplines namely: architectural, civil, drainage, electrical, environmental, mechanical, roadway, structural, trackwork, and utilities and may be supplemented with requirements specific to each design need at any time.

3.0 RESPONSIBILITY

3.1 Program Staff

The program staff responsibilities include:

- A. Establishes existing field conditions for in-house design work.
- B. Reviews submitted designs for sufficient existing field condition data.

3.2 Document Control Staff

The document control staff responsibilities include:

- A. Maintains and updates library copy and distributes procedure updates to individuals issued copies of the EDG.
- B. Maintains/keeps all existing field condition documents.

3.3 Contracted Consultant Design Team

The contracted consultant team responsibilities include:

- A. Establishes existing field conditions for design work.
- B. Provides existing field condition findings to Program Staff.

4.0 REFERENCES

- A. FasTracks Project Controls Procedure Manual - DC- 2 Baseline Document
- B. EDG – 0 Purpose & Need - Introduction
- C. EDG – 2 Subsurface Utility Engineering

5.0 PROCEDURES

5.1 Establishing Existing Conditions Introduction

- A. Research and familiarize oneself with the project site and surrounding areas. Conditions that may affect a given project are as follows:
 - Physical aspects of the facility on site.
 - Future planned facilities.
 - Other in-house jobs (previous, on-going, future).
 - Proposed projects by other agencies.
 - Land use (previous and existing).
 - Environmental contingencies.
 - Legal restrictions.
- B. Study the site and site related documents to establish existing and proposed project site conditions. Investigation methods include:
 - Existing drawings, records, photos (aerial & detail) and other documents.
 - Site Visits (take digital pictures of site, natural, and manmade features).
 - New Locates, Surveys, Potholes, and Bores.
 - Federal, State, and Local laws and codes that govern development (including: protection of historic properties and environmental impact).
 - Public Involvement (community input, general concerns about land use in the area, specific concerns about the project, etc).
- C. Use the gathered information as the basis for design and design calculations, to construct new project structures, and to coordinate inter-disciplinary and inter-agency reviews.
- D. Collecting Information, what do you need to know?
 - Make certain you understand the project and the scope of work for your particular design discipline.
 - Research all data that may affect the design.
 - Verify the accuracy of all data used.
 - When in doubt, do not hesitate to ask questions early on rather than later.
 - Contact the Design Manager regarding changes or revisions to the scope.
 - Review recent similar projects to preview some of the problems that had to be overcome (lessons learned).
 - Confer with the other designers working on the project and share your information and data to accomplish a coordinated design.

5.2 Existing Drawings, Records, and Other Documents

- A. Often, much of the data on existing structures can be found on existing drawings and as-builts, or seen on aerial and other photos. Although care must be taken to ensure that the drawings have been updated properly and that the photos are recent, they are invaluable in situations where the

information cannot be obtained visually by field inspection. Even if the reliability of drawings and photos can be substantiated, a field inspection is required and other research is recommended. Additional work and field decisions may have been made subsequently and not recorded. Drawing Records for previous and proposed projects can be found at the following:

- RTD Document Control.
 - RTD past consultants.
 - Local City Planning and Public Works divisions.
 - County Court House for plats, ALTA surveys, Sundry Site Plans.
 - CDOT (Colorado Department of Transportation).
- B. Existing Utility information may be collected by contacting individual private utility owners in the Denver area as well as local municipalities for recent and proposed utility relocation plans. An updated file of Utility Owner contact information can be found on the RTD network drive.
- County Public Works departments.
 - Denver Assessment Division (public info, maps).
 - E-470 Public Highway Authority.
 - Northwest Parkway Public Highway Authority.
 - Local City Public Works, Electric, Water/Wastewater departments.
 - Private utility communications, drainage, electric, gas, irrigation, oil, sanitary sewer, steam, and water companies.
 - Utility Notification Center of Colorado (UNCC).
- C. Existing Real Property (land, buildings, etc.), ownership, and easement information may be collected by researching:
- Block and lot numbers, owners' names, references names, mailing addresses, phone numbers, building class, assessments, building dimensions, sale prices, etc.
 - Department of City Planning for area, land use and zoning maps, and zoning regulations.
 - Right-of-Way maps.
 - Tax Maps and Tax Records for block & lot data, street width, ownership, and assessed valuation.
 - Property Survey drawings for property boundaries.
 - Department of Transportation (Highway) maps for street widths.
 - RTD key map for RTD Bus, Light Rail, Commuter Rail facility information (route numbers, station types, etc.).
 - Utility Companies for owner's prior rights documentation (easements, franchise, joint use agreements, licenses, ownership, permits).
 - Department of Parks and Recreation for Parklands and protected Open Spaces.
 - Topographical Bureau & Topographical Maps for land use designation.
 - Department of Design and Construction for Records on City Owned property.

- D. Existing Survey drawings and records can be reviewed for data on existing topographical details. Existing Pothole/Boring drawings and records can be reviewed for subsurface details. Denver has two Datums (1929 & 1988). When looking at survey drawings and pothole/boring information, be sure you are working in or have converted to your current project datum. All RTD projects shall be based on NAVD 88. The following offices and references can be used to determine if surveys, potholes, and/or borings have been conducted for the project location:
- Local Cities for survey, bores, and GIS information.
 - County Assessors Office for ALTA surveys and Plats.
 - U.S.G.S geological maps (REI, etc.)

5.3 Site Visits

Site visits are conducted to find out what exists and to verify the information obtained from records previously examined. This section presents guidelines for conducting a successful field trip.

A. Before the Visit:

- Get Organized - Write down your specific objectives, all questions, and a list of information needed before the visit. Ask in your office if someone else requires information at the same location or nearby and coordinate efforts. Arrange a quick meeting with the field party before the field trip to discuss the objectives of the attendees of the field party and to clarify information and understandings to maximize the benefit of the trip. Consider if it is necessary to visit the site at a special time, i.e. rush hour, off-peak hour, during or after certain weather conditions, etc.? If so, cite the reasons in your notes.
- Equipment and Special Needs - Reserve any necessary equipment (camera, measuring wheel, writing device, scale, vehicle, etc.). Make certain you can load and operate the equipment and it is in good working order. Print out and bring drawings and/or data needed for field verification. Do not draw or document in the field what you already have. Take copies of the available drawings and mark them ahead of time. Record dimensions from a fixed known point that you already have, or can create on the drawings. To examine existing conditions of hard to reach areas you can use such items as Mirror(s), crowbar, or a bucket truck. Sometimes specialized equipment may be needed. Contact the appropriate personnel to arrange for use of equipment. In addition to equipment, assistance may be needed to operate the equipment or conduct a field inspection. Contact the appropriate personnel for assistance. Don't forget to check the forecast and dress appropriately (coat, umbrella, sunglasses, sunscreen, etc).
- Who is Going on the Field Trip? - You should always go with another person. Do you require the participation of a person from a design discipline besides your own? Do you need someone for another agency? In some instances, you may need an authorized party to meet you in the

field and give you access to a property or structure. Call ahead in order to have manholes, vaults, gates, and rooms opened by Operating Department personnel where necessary. Always try to contact the person(s) who will own, actually use, and/or maintain the facility. Do you need flagmen, access to facilities and/or safety or police protection? Send a notice of reminder about the scheduled trip to all persons involved.

- Safety, Security and Permissions - You may need permission or approval to visit the site? Safety vests, eye protection, hardhats, and steel toe shoes are required on FasTracks corridors during construction. Safety vests are recommended for safety at all times on all site visits. All visits to any Rail Road properties require special Railroad On Track Safety training. Before entering any Railroad property, you must contact the railroad and gain the necessary approval needed to access the railroad property and to arrange for trained railroad flagpersons. If you plan to be within 25 feet of any RTD LRT or CRT, you must complete an annual RTD on-track safety training prior to your site visit. In addition, you need to acquire an on-track permit and inform operations.

B. At the Site:

- Photography – Take plenty of photographs. The only bad photo is the one you forgot to take. Make a key plan of the direction and location of photographs as you take them in the field. Does the subject need a scale? If so, do you have the exact dimensions of a large item in the photograph? Do you have a ruler or other measuring device (i.e. scale stick or a purposefully placed person) in the photograph? If you can't measure an item, count and record repeating items with commonly known dimensions (i.e., tiles, blocks, panels, tiles, columns, bents, etc.). If a video camera is used be sure you include verbal identification and explanations of each view. This may require you to stop and think of what you're going to say before you start filming each portion. Go slowly and hold for at least 10 seconds at areas you consider important.
- Field Notes – Write clear and legible notes that you and other team members can read and understand days later back in the office. When interviewing on-site staff, note the name and telephone number of the person'(s) answers to each of your question. Record project boundaries for existing facilities and proposed new construction. The boundaries include the footprint of the building, the height above and the depth below ground and the branch connections between public utility and telephone lines and the structure. Record location and size of trees, plantings, sidewalk gratings, driveways, street furniture, distinctive sidewalks and roadways (describe) and other key features. When recording the project boundaries be certain to identify adjacent properties, buildings and spaces. Identify the boundaries of the survey area. Observe the areas surrounding the project area. You never know if additional real estate is required for permanent use or if an easement will be required. Determine what structures, equipment and utilities (above and below ground) within the boundaries are

likely to remain in place, be relocated, abandoned or demolished. Identify location of borings.

- *What to Look for in Existing Structures* - When the proposed work involves the rehabilitation of an existing structure or new work is in or around an existing structure, check the disciplines listed below. Check all systems in the area that may be deteriorated or that require upgrading to permit a complete rehabilitation to be accomplished.
 - **Architectural:** Inspect roof areas for signs of deteriorated roofing, flashing, drains and damaged parapets. Note if any special features in the existing structure and/or facility must be preserved, such as: historical items, tile wall reliefs, station identification signs, shop entrances, security booths, etc. Identify the existing services to the facilities. Note any areas of deficiencies regarding exit requirements and code compliance. These services should be accommodated in the new design. The sizes of all services should be identified in the event that an upgrade is required in the design phase. A cross-check of on-going projects and future planned projects that would impact on the same area should be made. The designer can thus properly size the new utilities required for the project.
 - **Electrical:** Inspect electrical distribution room to determine if it is overcrowded and will require consolidation and upgrading. Check raceways, AC and DC electrical services to the facility and taps on the service. Abandoned equipment should be removed.
 - **Environmental:** The designer should contact the FasTracks Environmental staff for an assessment of the project's potential impact to the environment and suggestions for alternative designs. An Environmental Impact Statement (EIS) is a required document for federally funding projects and presents the issues surrounding a proposed project/action. It identifies potential adverse impacts, and recommends ways to mitigate them. An Environmental Site Assessment (ESA) has two phases. Phase I ESA involves document review and identification of potential environmental issues/risks. Phase II ESA involves identifying potential environmental risk and possible hazardous materials through drilling and sampling of soil and ground water to verify the issues/risks. Each project will have different environmental requirements depending on the impacts identified. The designer/construction contractor will submit construction related environmental permits (such as a dewatering permit, NPDES, etc.) and approval requests to the appropriate regulatory agencies. Listed below are some examples of items for which environmental assessments may be required as part of an EIS:
 - Any action that may introduce hazardous materials into the air, ground, or water
 - Change of flow in water
 - Encroachment on designated wetland areas

- Change of ground water level
 - Traffic impact of street openings/closings
 - Ecologically sensitive areas
 - Endangered Species
 - Historic or landmark districts
 - Any action that affects traffic flow
- **Hazardous Waste and Asbestos:** Provide handling and disposal of hazardous materials by following the Materials Management Plan (MMP) as outlined in the corridor specific Voluntary Clean Up Plan (VCUP). Follow System Safety Department's Design Guidelines for "Asbestos Identification, Handling and Removal", and the Design Guidelines for "Outdoor Hazardous Waste Storage Areas".
 - **Mechanical:** Inspect HVAC duct, vents and related equipment. Note their size and location. Inspect elevators and hoist equipment. Note location of firefighting equipment, and other safety related equipment to ensure that they can be maintained, replaced, or relocated in the new design.
 - **Structural:** Examine the walls, floors and ceiling area carefully. Do you see evidence of structural damage? Look for cracks in the brick or masonry enclosure around columns. This could indicate that the columns are corroding and may need repair. Look for cracks in masonry wall, floor and roof slabs. Try to determine if the cracks are the result of settlement, expansion, shrinkage, or damage by user. Is there evidence of differential settling of floor slabs? If so, record difference or pitch of slope. Check for water leaks in the stains on walls, columns and ceiling areas, which would indicate roof leaks. Look for corroded structural steel members, pipes, supports, plumbing fixtures, equipment and/or other components of the facility or on site that could have an adverse impact on the project. Are there any unusual buildings or special structures such as bridges, tunnels, culverts, or retaining walls in the area?
 - **Topography & Site Orientation:** Will the site orientation affect the design, such as location of windows and skylights for shops and depots, to maximize natural lighting? Are there any natural features such as rivers, lakes, ponds, rocks, trees, etc. that will impact the proposed work? Note high and low points both within and around the proposed site in order to provide for proper drainage.
 - **Trackwork:** Are there existing tracks? Are they Light Rail, Commuter Rail, Heavy Rail? Who owns and operates them (RTD, BNSF, etc.). Do they appear to be in use? Will the existing tracks be re-used in the new project, or will they be removed?
 - **Traffic (Access / Egress):** One of the key items to consider when visiting a job site during the design phase is access. Are homes and businesses accessible? Can the contractor get equipment and materials to and from the site in order to work? Will the contractor

require work trains and service diversions in order to work? Is there a roadway to the facility that the contractor will be able to use? Will the contractor's equipment and materials have to cross the track area, 3rd rails, etc? Is there an area in the facility or adjacent to it that the contractor will be able to use for storing materials? The contractor is responsible for ensuring that water and electricity are available by making temporary connections to nearby water supply lines, plumbing lines and electrical service. Note the street widths, traffic patterns, restricted areas, access for emergency vehicles, etc. Record the location of street intersections, traffic lights, etc.

- **Utilities:** Record location of the following facilities: communications (fiber optic and telephone manholes), electric (power poles, street lights, traffic signals, control panels), gas (main line & services), storm drainage (manholes, inlets, detention/retention basins, culverts, direction of flow, etc.), sanitary sewer (manholes), water (fire hydrants, manholes, valves, etc.). Abandoned systems (to be left in place or removed). Be sure to note if the facilities are overhead or underground and approximate height or depth if discernable. Measure facility offset from property line or back of curb. Record the company owner if possible. All projects involving Utilities, whether relocating or protecting in place, will require coordination with and reviews by outside agencies. Existing utility conditions should be verified with the private utility owners

C. Before You Leave:

- Do you have all the information? Look around and think. Is there anything else that should be recorded? If you have any doubts, record the information. Do not assume that someone else has done something that you know is necessary - ask.
- Does your data make sense? Reread your data to ensure you will be able to understand the information when you return to the office. Show your data to another member of the field party while you are still on the site.
- Last but not least, *make* a list of people who are there. Obtain phone numbers of maintainers and operators at the site.

D. Back In the Office:

- Download pictures and label the photo files with meaningful names,
- Write up site visit summaries, and log information in a timely manner, and transcribe your data neatly and clearly.
- Be sure to date all notes and photos.
- Have someone who was not there to review the Site Visit package.
- Arrange another quick meeting to summarize site investigation findings to those individuals who have requested the information or who would benefit from it.
- Place data in a shared folder location accessible to all persons on your design team and let the team know it is there and how to access it.

5.4 New Locates, Surveys, Potholes, Bores

There will be an on call Subsurface Utility Engineering service available to internal RTD FasTracks needs (see EDG – 2 for procedures).

5.5 Laws / Codes / Zoning / Special requirements



Typically, local authorities and agencies implement these laws through a project design review and approval process. Although exempt from compliance with some local codes and regulations, it is the policy of RTD to adhere when feasible, and to cooperate with government agencies and local authorities.

- Adherence to the CO State Uniform Fire Prevention and Building Code is mandatory. Fire Department conducts inspections of bus depots, standpipes in stations and underground storage tank installations. The department will review design drawings when requested by RTD.
- The designer should conduct a zoning analysis of the project area. Determine the area zoning, the type of construction permitted and the bulk and use regulations.
- Locate special zoning districts that may provide opportunity for improvement to transit facilities at substantially reduced costs. (i.e. Historic District, Mixed Use District, Commercial District).
- What are the parking requirements? Calculate the number of off-street parking spaces required; enclosed, unenclosed.
- Record architectural features and material finishes used at adjacent properties. The design of new or altered buildings should reflect the architectural character of the area. Orient the structure or building so that it has minimal impact on scenic views.
- The design should be compatible with adjacent properties. If the project will affect a historic property or is located in a historic district the designer should be particularly sensitive to the architectural style for which the structure or district is noted. If feasible, restore or reproduce historic architectural embellishments damaged or destroyed during construction. Parkland or other 4f land should be treated with care. The design should sit comfortably within the natural setting. Develop measures to mitigate any adverse impacts on natural resources in the area. Remember the environment! TA projects must comply with applicable Federal, State and local Regulations and Codes in the area of air/water pollution, hazardous raw materials/waste storage and handling. Don't overlook aesthetic design when planning the functional layout or selecting colors and material finishes for the structure.
- Consider the requirements of private utility owners.

6.0 ATTACHMENTS

None

7.0 APPROVAL

Revision Level:	Approved By:	Signature	Date
Major Revision	John Shonsey, Senior Manager Engineering		10-16-07
Minor Revision	Henry Stoppelcamp, Engineering Technical Services Manager		10/16/07

8.0 REVISION RECORD

Revision Level	Revision Date	Summary	Approval Date
0	10/12/07	Initial Baseline Issue	