1.0 PURPOSE

Engineering design reviews are needed to ensure quality end products are delivered to RTD. The purpose of this procedure is to guide the focus and approach of engineering design reviews. This guideline outlines what is expected from the review team and helps the review team perform reliable, quality, and timely design reviews of consultant submittals.

2.0 SCOPE

This Engineering Design Review procedure includes all the information needed to guide the review team through the review process. It defines the following:

- 'review team' (staff assigned to perform reviews),
- types of documents to be reviewed,
- number of reviews expected,
- what tools shall be used to perform the review,
- review schedule.

The reviews are performed to ensure the designs are being done in accordance with the design criteria and other requirements for each project.

3.0 RESPONSIBILITY

3.1 Engineering Technical Support Staff

The ETS staff responsibilities include:

A. Each design discipline on the engineering staff shall be responsible for performing specific discipline reviews as well as coordinating interdisciplinary reviews with other disciplines.
B. The Engineering Technical Services Manager shall be responsible for back-checking the reviews performed by the engineering staff.
C. Engineering Project Managers shall review entire submittals.
D. Engineering Assistant Project Managers shall compile all review comments.

3.2 Quality Management Oversight Staff

The QMO staff responsibilities include:

A. Maintains and manages the QMO database.
B. Manages official reviews.

3.3 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.

3.4 Contracted Consultant Design Team

The contracted consultant design team responsibilities include:

A. Submit design packages for review by ETS staff.
B. Respond to ETS staff review comments.

4.0 REFERENCES

A. Engineering Design Guidelines Manual – EDG-9 Engineering Review Checklists
B. Quality Management Oversight Procedures, P2, P3, & P4 – regarding the use of the QMO Database
C. FasTracks Project Controls Procedure Manual – DC-2 Baseline Document

5.0 PROCEDURES

5.1 Review Team Focus

A. The RTD ETS staff shall make up a significant portion of the 'review team' and shall be responsible for the primary reviews of all portions of each submittal that relates to their disciplines and secondary coordination reviews of other related discipline designs.

ETS DISIPLINES	PRIMARY DESIGN REVIEW	PRIMARY COORDINATION REVIEW
Architecture	Architectural	Stations, park-n-Rides
Civil / General	Grading, Roadway, and Traffic	Drainage, Station, Trackwork, and Utilities
Drainage	Grading and Drainage	Civil, Trackwork and Utilities
Environmental	Environmental	Civil and Drainage
Construction	Inter-disciplinary reviews, Constructability, Phasing plans	All disciplines for design integration
Structural	Structures (Bridges, Tunnels, Walls, etc)	Drainage, Roadway, Trackwork, and Utilities

Systems / Electrical / Mechanical	Electrical and Mechanical Systems, Corrosion control / Cathodic protection	Trackwork and Utilities
Trackwork	Rail design	Drainage, Roadway, Structures, and Utilities
Utilities	Utilities (Communications, Electric, Gas, Sanitary Sewer, Water, etc)	Drainage and Structures
OTHER ETS GROUPS	**PRIMARY DESIGN REVIEW**	**PRIMARY COORDINATION REVIEW**
Operations	All disciplines	n/a
Maintenance	All disciplines	n/a
Safety	All disciplines	n/a

B. Other RTD, non-ETS staff, shall also participate in the review process:
   - Architectural and Architectural Landscaping Group
   - Park-n-Ride Group

C. CAD staff shall review all drawings for Project CADD criteria compliance.

D. Each discipline is responsible to do a cursory review of all other disciplines to make sure there are no interdisciplinary conflicts with their own discipline designs, and to verify that each discipline accurately represents the required information.

E. The Project Managers and Assistant Project Managers shall be responsible for the overall reviews of entire submittal packages for their projects and for compiling the comments submitted by the engineering, operations, and maintenance staff.

5.2 Review Approach

While the focus of review for each discipline group may vary, the review approach shall be the same:

- All engineering design staff shall obtain the necessary QMO training provided by the Quality Management Oversight staff in order to thoroughly understand required review procedures.
- Each discipline group, through the Engineering Technical Support Manager, shall obtain all necessary submittal documents in appropriate formats from the Project Manager, to successfully complete a quality review.
- Engineering Design reviewers shall use the ERCs as a tool to help guide the review efforts and properly prioritize specific review order.
- All comments should be typed and saved in Word or Excel before entering the data into the QMO Database. This file should be saved until the next design review phase to ensures a backup of all comments are available in the event comments need to be verified or re-entered for any reason.

- After comments are written, in accordance with the priority and required criteria checklists, these comments shall be copied into the QMO database in the correlating and correct locations.

Note: the ERCs and the QMO Database shall correlate with each other.

5.3 Types of Documents to be Reviewed

Project Plans
Design Calculations
Project Specifications
Design and Construction Estimates
Other project PS&E

5.4 Formal Review Schedule

Formal scheduled submittals for Federally funded projects are expected at the following design phases:

- Basic Engineering (DEIS)
- Advanced Preliminary Engineering (50% Design)
- Final Design 65%
- Final Design 90%
- Final Design 100% (RFC)

Non-Federally funded projects may have different submittal and review schedules (i.e. 30%, 65%, 90%, 100%). The time frame allowed for the review of each design phase submittal shall be based on specific project needs, but shall not be more than three (3) weeks.

5.5 Informal Reviews

Informal submittals may occur at other design phases and may not be scheduled. The time frame allowed for the review of each design phase submittal shall be based on specific project needs, but shall not be more than three (3) weeks.

5.6 Tools used for Review

Several tools shall be used for performing Informal and Formal reviews.

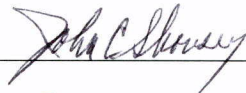
- ERCs shall be used for both Informal and Formal reviews to help consistify internal review efforts (defines levels of criteria and lists minimum criteria to be reviewed at each design phase). (see EDG – 9 for procedures and discipline specific Engineering Review Checklists)
- QMO Database shall be used for Formal reviews to log and track all review comments and responses.

- Review Checkprints shall be used to assure a quality and interdisciplinary review is being done for both In-house and Consultant design submittals. Different levels of review are expected for different design phases. (see EDG – 11 for procedures).

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 Stopplecamp, Engineering Technical Services Manager		10-16-07

8.0 REVISION RECORD

Revision Level	Revision Date	Summary	Approval Date
0	10/12/2007	Initial Baseline Issue	