Chapter 2
DESIGN APPROVAL PROCESS

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2 DESIGN APPROVAL PROCESS

The Traffic-Roadway Section has reviewed and approved traffic signal plan sheets for many years with the effort becoming formalized in the mid 2000's when ODOT decentralized the design functions of the agency. The main focus of the Traffic-Roadway Section's design review and approval is to identify and resolve any errors/omissions so that the design as shown in the plan sheets:

- is safe for the public
- meets the requirements of the operational approval documentation
- meets the requirements of the MUTCD and other applicable ODOT design, policy and guideline documents.
- is maintainable (ease of maintenance and economical)
- is constructible (staging, schedule, and economical)
- is readable and can be understood by those in the industry (drafting standards)
- contains clear, non-conflicting information
- results in zero to minimal construction change orders

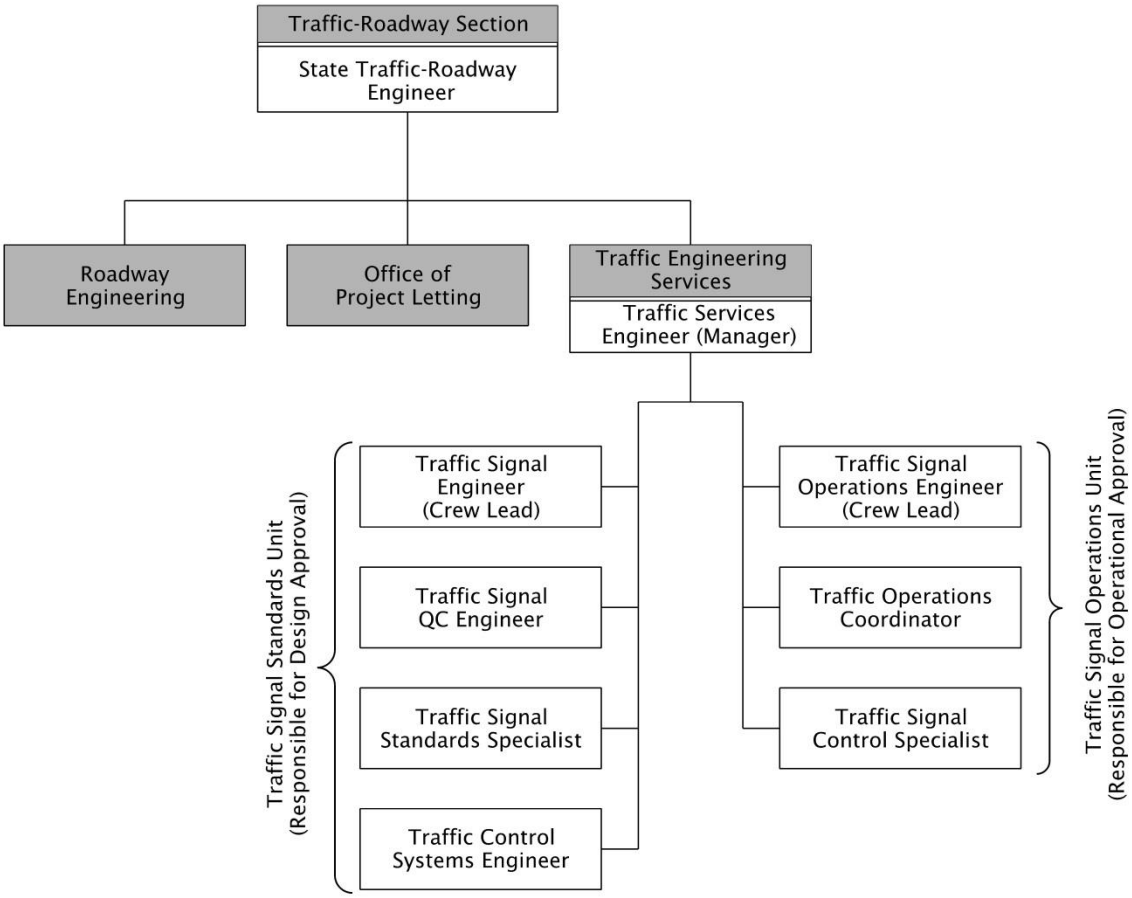
The Traffic-Roadway Section's design review will look at big picture issues as well as the details of the design, down to the conduit sizes and wire counts. The design review also includes a review of the signal operation details by the Traffic Signal Operations Unit. The operational review is coordinated by the Traffic Signal Engineer. As expected, reviews during the early phases of the design process will be more focused on big picture issues, becoming more focused on the details as design phase progresses. Typically a detailed review of the plans cannot be completed until the big picture issues are resolved, so it is important to address the big picture issues as early as possible.

Note: There are two separate types of approvals for traffic signal work – the Operational Approval and the Design Approval. See Chapter 3 for information on the Operational Approval.

2.1 Traffic-Roadway Organizational Structure

It is helpful to understand how the Traffic-Roadway section is organized and how the key positions will interact with the signal designer during the design review process. The organization chart below shows only the traffic signal related positions.

Figure 2-1 | Organization Chart



2.2 Design Exceptions, Non-Standard Design, and Experimental Design

All traffic control devices installed in the state of Oregon are required to conform to the Manual on Uniform Traffic Control Devices (MUTCD) and the Oregon Supplements as to the MUTCD as established by ORS 810.200 and OAR 734-020-0005.

The MUTCD, as well as this manual, contains Shall, Should, and May language which indicates what is required, recommended, and optional. Traffic design should not deviate from a Shall or Should statement unless it is prudent to do so, as per section 1A.13 of Oregon Supplement to the MUTCD.

Section 1A.13 of the Oregon Supplement to the MUTCD: "The decision to use a particular device at a particular location is typically made on the basis of an engineering study at the location. Thus, while this Manual provides standards for design and application of traffic control devices, the Manual is not a substitute for engineering judgment. It is the intent that the provisions of this Manual be standards for traffic control devices installation, but not a legal requirement for installation."

If the design or operation of a traffic control device must deviate from a Shall or Should statement, the deviation will be addressed by the Traffic-Roadway Section in the form of either an Operational Approval (see Chapter 3) or through the Design Approval process (see Section 2.6) depending on the nature of the deviation. The design exception process, used in other disciplines like roadway design, is NOT used for traffic design. However, new requirements for pushbutton accessibility are an exception and will require a Roadway Design Exception if they cannot be met. See Section 5.4 for detailed information.

Certain deviations may be considered experimental and require an additional approval from FHWA. All requests for FHWA experimental approval are processed by the Traffic-Roadway Section. See the ODOT Traffic Manual section 6.18 for more information on exceptions, deviations, and requests to experiment.

2.3 Overhead Structures and Vertical Clearance Standards

Contact the Region Mobility Liaison when any proposed project (new construction, reconstruction, preservation, or maintenance) adds a new or modifies an existing overhead structure (Truss Sign Bridge, Monotube Cantilever, Signal Mast arm, and Signal Strain Pole) regardless of meeting the existing minimum vertical clearance standards. In addition, contact the Region Mobility Liaison for any project that reduces the existing vertical clearance regardless of meeting the minimum vertical clearance standards. The Region Mobility Liaison will provide the appropriate coordination with the Region, and MCTD. This coordination should address not only project specific mobility requirements, but also any corridor level vertical clearance and mobility needs. Vertical clearance greater than 19'-0" for sign, VMS, and signal support structures are considered non-standard and require a design exception. The Traffic designer is to follow the procedures outlined in Chapter 14 of the HDM. The design exception

request process for increasing the vertical clearance greater than the above mentioned 19'-0" will need to consider safety, operations, and impact to other design features in order to support the approval of the design exception.

2.4 Project Types That Require Design Approval

There are four different types of projects which might contain traffic signal work that requires review and Design Approval of the Traffic-Roadway Section:

1. **Projects let for bid by ODOT**
   This is the typical method ODOT uses. The plans and specifications are developed within a project team. The work is reviewed and approved by the Traffic-Roadway Section before the project is let for bid.

2. **Projects let for bid by a local agency**
   The Local Agency, typically a City or County, lets the contract for bid. The ODOT Local Agency Liaison coordinates reviews of the plans and specifications within ODOT. The work is reviewed and approved by the Traffic-Roadway Section before the local agency is allowed to let the contract for bid.

3. **Projects by ODOT Permit**
   ODOT will issue a permit to work on State Right of Way. A common scenario is a developer wants to improve an area such as building a large retail store. This large retail store will impact the State Highway and typically some sort of mitigation is required. The ODOT District Office coordinates with the ODOT Region Traffic Engineer and the developer and issues a permit for construction once the work is reviewed and approved by the Traffic-Roadway Section.

4. **Projects by State Forces.**
   Plans and specification are created and given directly to State Forces for construction. Typically these projects are simple in scope such as upgrading to countdown pedestrian signals or changing left turn phasing. The project is developed similar to "projects let for bid by ODOT" described above, but considerably less formal. See Chapter 23 for more information on state force work.

2.5 Plan Sheets That Require Design Approval

Design Approval is required for each plan sheet that contains signal work. The Traffic-Roadway Section shall approve the following plan sheets for all ODOT owned **or** maintained traffic signals before the project is let for bid:

1. Permanent signals, both new installations and modifications to existing signals. This includes all components of a traffic signal: signal, detector, interconnect, details, railroad preemption, existing utilities, etc.
2. Temporary signals (excluding portable temporary signals)
3. Ramp Meters
4. Actuated flashing beacons (includes RRFB, Tunnel, and Bridge applications)
5. Flashing beacons mounted overhead
6. Pedestrian signals
7. Fire signals
8. Red light enforcement

Review and approval is NOT required for local agency owned **and** maintained traffic signals. However, federally funded local agency projects may request a courtesy review from the Traffic-Roadway Section for compliance with federal and state minimum requirements.

2.6 Design Approval Process

Plan sheets should be submitted to the Traffic Signal Engineer for review at all major project milestones; DAP (Design Acceptance Package), Preliminary, Advanced, and Plans-in-Hand. Plans may also be submitted for review independently of the project's major milestones or Project Leader's official schedule if it makes sense to do so. The design plans should progress in level of detail and completeness at each milestone. The requirements for each milestone, as detailed below, will enable efficient TRS reviews (faster turnaround, with fewer comments to address) and also should result in less re-work for the signal designer between reviews.

Use the Excel QA/QC Checklists (with hyperlinked examples) before submitting the plans for Traffic Standards Review. This will drastically reduce the number of comments to address during the review period!

1. DAP Plans (60% complete):
    a. Signal plan sheet
        i. Number of lanes & lane use (as per the completed Operation Approval)
        ii. Crosswalks/Crosswalk closures (as per the completed Operation Approval)
        iii. ADA ramps (i.e. basic style to be used to identify the amount of right-of-way needed to accommodate proper placement).
        iv. Normal Signal Phasing diagram (as per the completed Operational Approval)

v. Location of mast arm poles, strain poles, pedestals, controller cabinet, and service cabinet (used to identify the amount of right-of-way needed to accommodate proper placement).
vi. Location of potential commercial power source
vii. Existing and proposed right-of-way lines shown

b. Detector Plan Sheet
   i. Location and type of detection (loops, radar, video)
   ii. Detection Zones (for video or radar)
   iii. Loop numbers if applicable
   iv. Place holder for input file and/or loop wiring diagram

c. Identification of lane reductions occurring within ½ mile of the intersection and verification that the length before reduction can accommodate standard traffic control devices/signal operation (used to identify the amount of right-of-way needed to accommodate proper placement).

d. Identification of the basic temporary workzone strategy and need for temporary signals. If a temporary signal plan sheet will be required, the DAP requirements listed above for the signal plan sheet also apply to the temporary signal plans.

e. Placeholder signal plan sheets that will be needed with appropriate titles and intersection info (legend, detector plan, interconnect plan, existing utilities, details, removal, railroad preemption plan sheet, temporary signal plan, etc.)

2. Preliminary Plans (90% complete):
   a. The signal appurtenances should all be detailed with bubble notes for each plan sheet at this stage.
      i. signal heads, pedestrian heads, pushbuttons
      ii. regulatory signs
      iii. junction boxes
      iv. conduit
      v. wiring (signal, detector, and interconnect)
      vi. Illumination and photoelectric cell
      vii. fire preemption detectors
      viii. Crosswalk closure barricades
      ix. Detector layout and detector wiring diagram
      x. Fire preemption diagram
      xi. Right-of-way lines established
   b. Photometric analysis complete
   c. Railroad preemption plan sheet complete
   d. Place holder signal plan sheets for temporary/stage construction
3. Advance Plans (99% complete):
   a. Label all poles and pedestals on project
   b. Pole entrance chart completed
   c. Geotech report finished and referenced near pole entrance chart
   d. List of applicable standard drawings in the first sheet of the plan set
   e. TSSU No.
   f. Custom notes

   g. Temporary/Stage construction plan sheets detailed
4. Final Plans (100% complete)
   a. TRS Dwg. Numbers

The Traffic-Roadway Section is available at every step of the way during the design process to help answer questions, evaluate alternatives, and provide assistance.

For projects that are stored in ProjectWise, the designer should forward the distribution set at each project milestone to the State Traffic Signal Engineer. The Traffic-Roadway section will access the design documents from ProjectWise and provide review comments in the project's comment log. The Traffic-Roadway Section will inform the designer when all their comments have been entered in the comment log for the designer to address by the project milestone (or sooner).

For projects that are NOT stored in ProjectWise, plans may be submitted either electronically (preferred) or hard copy. If submitting electronically, the preferred format is a single PDF of the entire plan set. Other discipline's plan sheets for the project (temporary workzone, roadway, signing, striping, illumination, etc.) are helpful when reviewing the traffic signal plans. Once the review is complete, a list of comments is sent to the signal designer to be addressed by the next project milestone (or sooner).

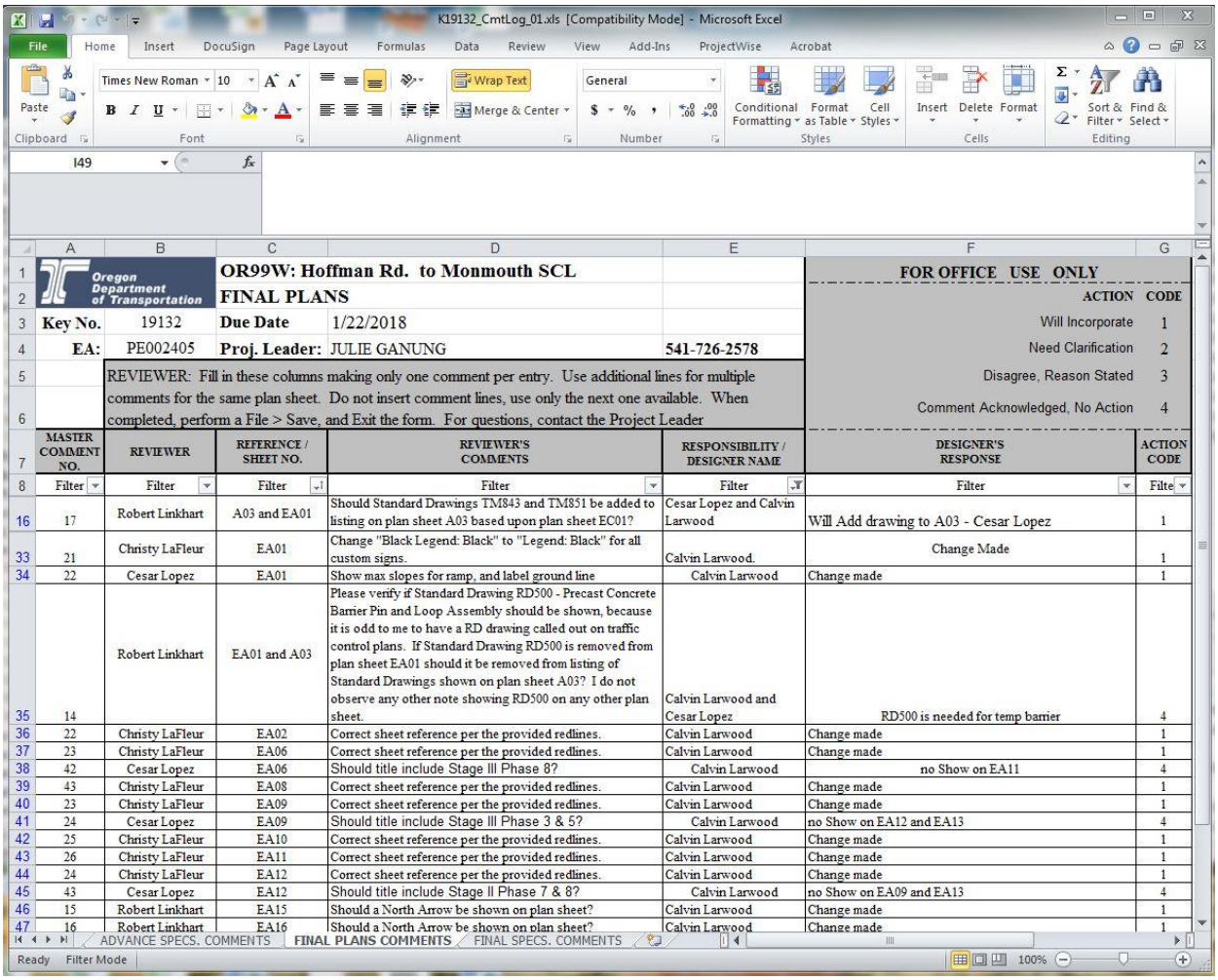
It is very beneficial to provide a design narrative along with the plan sheets. For complex projects or when the constraints/scope of the project requires non-standard design, the signal designer should set up a meeting with the Traffic-Roadway Section to discuss the project and constraints, as this can greatly reduce the amount of time needed for review and the number of comments/questions resulting from the review.

The standard time frame for the Traffic-Roadway Section review is two weeks, but this could be more or less depending on the workload/deadlines at the time. There is no limit to the number of reviews that are conducted and they may not correspond to the number of official major project milestone reviews; some projects may only require one (simple, small project) while some projects may require seven or more (complex, large project or projects with non-standard design).

Complex Project? Constraints requiring non-standard signal design?
Schedule a meeting with the Traffic-Roadway Section to discuss!

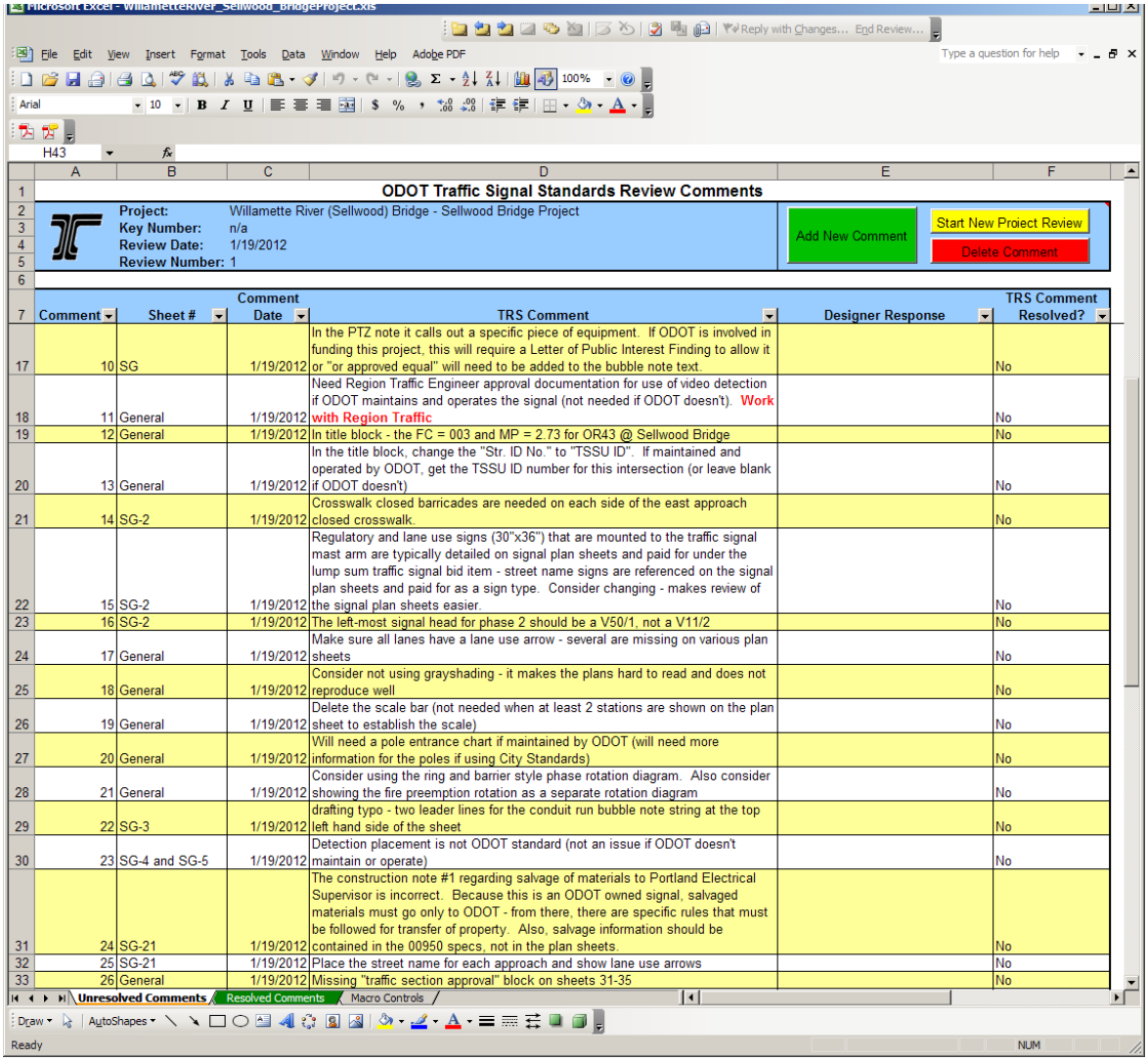
The comments from the Traffic-Roadway Section review are contained in either the project comment log or an excel spreadsheet that assigns a unique comment number to each comment made. See Figure 2-2 and Figure 2-3. Red line mark-ups of plan sheets are not done. Each comment will have a date and sheet number associated with it (or it will indicate "General" if the comment applies to multiple sheets). There is a column "Designer Response" that is for the signal designer to use to respond to each comment. When all of the Traffic-Roadway Section comments have been addressed by the designer, the updated plans need to be re-submitted to the Traffic-Roadway Section with the excel spreadsheet containing the designer response to the Traffic-Roadway Section comments. <u>All of the comments must be resolved to the Traffic Signal Engineer's satisfaction prior to getting the approval signature.</u>

Figure 2-2 | Project Comment Log Sample



	A	B	C	D	E	F	G
1	Oregon Department of Transportation		OR99W: Hoffman Rd. to Monmouth SCL			FOR OFFICE USE ONLY	
2			FINAL PLANS			ACTION	CODE
3	Key No.	19132	Due Date	1/22/2018		Will Incorporate	1
4	EA:	PE002405	Proj. Leader:	JULIE GANUNG	541-726-2578	Need Clarification	2
5		REVIEWER: Fill in these columns making only one comment per entry. Use additional lines for multiple				Disagree, Reason Stated	3
6		comments for the same plan sheet. Do not insert comment lines, use only the next one available. When completed, perform a File > Save, and Exit the form. For questions, contact the Project Leader				Comment Acknowledged, No Action	4
7	MASTER COMMENT NO.	REVIEWER	REFERENCE / SHEET NO.	REVIEWER'S COMMENTS	RESPONSIBILITY / DESIGNER NAME	DESIGNER'S RESPONSE	ACTION CODE
8	Filter	Filter	Filter	Filter	Filter	Filter	Filte
16	17	Robert Linkhart	A03 and EA01	Should Standard Drawings TM843 and TM851 be added to listing on plan sheet A03 based upon plan sheet EC01?	Cesar Lopez and Calvin Larwood	Will Add drawing to A03 - Cesar Lopez	1
33	21	Christy LaFleur	EA01	Change "Black Legend: Black" to "Legend: Black" for all custom signs.	Calvin Larwood.	Change Made	1
34	22	Cesar Lopez	EA01	Show max slopes for ramp, and label ground line	Calvin Larwood	Change made	1
35	14	Robert Linkhart	EA01 and A03	Please verify if Standard Drawing RD500 - Precast Concrete Barrier Pin and Loop Assembly should be shown, because it is odd to me to have a RD drawing called out on traffic control plans. If Standard Drawing RD500 is removed from plan sheet EA01 should it be removed from listing of Standard Drawings shown on plan sheet A03? I do not observe any other note showing RD500 on any other plan sheet.	Calvin Larwood and Cesar Lopez	RD500 is needed for temp barrier	4
36	22	Christy LaFleur	EA02	Correct sheet reference per the provided redlines.	Calvin Larwood	Change made	1
37	23	Christy LaFleur	EA06	Correct sheet reference per the provided redlines.	Calvin Larwood	Change made	1
38	42	Cesar Lopez	EA06	Should title include Stage III Phase 8?	Calvin Larwood	no Show on EA11	4
39	43	Christy LaFleur	EA08	Correct sheet reference per the provided redlines.	Calvin Larwood	Change made	1
40	23	Christy LaFleur	EA09	Correct sheet reference per the provided redlines.	Calvin Larwood	Change made	1
41	24	Cesar Lopez	EA09	Should title include Stage III Phase 3 & 5?	Calvin Larwood	no Show on EA12 and EA13	4
42	25	Christy LaFleur	EA10	Correct sheet reference per the provided redlines.	Calvin Larwood	Change made	1
43	26	Christy LaFleur	EA11	Correct sheet reference per the provided redlines.	Calvin Larwood	Change made	1
44	24	Christy LaFleur	EA12	Correct sheet reference per the provided redlines.	Calvin Larwood	Change made	1
45	43	Cesar Lopez	EA12	Should title include Stage II Phase 7 & 8?	Calvin Larwood	no Show on EA09 and EA13	4
46	15	Robert Linkhart	EA15	Should a North Arrow be shown on plan sheet?	Calvin Larwood	Change made	1
47	16	Robert Linkhart	EA16	Should a North Arrow be shown on plan sheet?	Calvin Larwood	Change made	1

Figure 2-3 | Excel Comment Spreadsheet Sample



ODOT Traffic Signal Standards Review Comments

Project: Willamette River (Sellwood) Bridge - Sellwood Bridge Project
Key Number: n/a
Review Date: 1/19/2012
Review Number: 1

Add New Comment | Start New Project Review | Delete Comment

Comment	Sheet #	Comment Date	TRS Comment	Designer Response	TRS Comment Resolved?
10	SG	1/19/2012	In the PTZ note it calls out a specific piece of equipment. If ODOT is involved in funding this project, this will require a Letter of Public Interest Finding to allow it or "or approved equal" will need to be added to the bubble note text.		No
11	General	1/19/2012	Need Region Traffic Engineer approval documentation for use of video detection if ODOT maintains and operates the signal (not needed if ODOT doesn't). Work with Region Traffic		No
12	General	1/19/2012	In title block - the FC = 003 and MP = 2.73 for OR43 @ Sellwood Bridge		No
13	General	1/19/2012	In the title block, change the "Str. ID No." to "TSSU ID". If maintained and operated by ODOT, get the TSSU ID number for this intersection (or leave blank if ODOT doesn't)		No
14	SG-2	1/19/2012	Crosswalk closed barricades are needed on each side of the east approach closed crosswalk.		No
15	SG-2	1/19/2012	Regulatory and lane use signs (30"x36") that are mounted to the traffic signal mast arm are typically detailed on signal plan sheets and paid for under the lump sum traffic signal bid item - street name signs are referenced on the signal plan sheets and paid for as a sign type. Consider changing - makes review of the signal plan sheets easier.		No
16	SG-2	1/19/2012	The left-most signal head for phase 2 should be a V50/1, not a V11/2		No
17	General	1/19/2012	Make sure all lanes have a lane use arrow - several are missing on various plan sheets		No
18	General	1/19/2012	Consider not using grayshading - it makes the plans hard to read and does not reproduce well		No
19	General	1/19/2012	Delete the scale bar (not needed when at least 2 stations are shown on the plan sheet to establish the scale)		No
20	General	1/19/2012	Will need a pole entrance chart if maintained by ODOT (will need more information for the poles if using City Standards)		No
21	General	1/19/2012	Consider using the ring and barrier style phase rotation diagram. Also consider showing the fire preemption rotation as a separate rotation diagram		No
22	SG-3	1/19/2012	drafting typo - two leader lines for the conduit run bubble note string at the top left hand side of the sheet		No
23	SG-4 and SG-5	1/19/2012	Detection placement is not ODOT standard (not an issue if ODOT doesn't maintain or operate)		No
24	SG-21	1/19/2012	The construction note #1 regarding salvage of materials to Portland Electrical Supervisor is incorrect. Because this is an ODOT owned signal, salvaged materials must go only to ODOT - from there, there are specific rules that must be followed for transfer of property. Also, salvage information should be contained in the 00950 specs, not in the plan sheets.		No
25	SG-21	1/19/2012	Place the street name for each approach and show lane use arrows		No
26	General	1/19/2012	Missing "traffic section approval" block on sheets 31-35		No

Don't forget to include the excel spreadsheet with designer responses when Re-submitting plans for review! This helps decrease the time needed for plan review.

2.6.1 ODOT Let Projects

For ODOT let projects the Project Leader or Consultant Project Manager will be in charge of the schedule and plan review distribution for each milestone. In this case, follow the process as stated by the Project Leader or Consultant Project Manager for plan review distribution. The signal designer should check with Traffic-Roadway Section to ensure the distribution has been received. For state force projects, the design phase

is not as formal as a standard STIP project and the signal designer will likely be in charge of the schedule for plan review distribution.

It is the signal designer's responsibility to make sure that a set of the plans makes it to the Traffic Signal Engineer for review; either by adding the Traffic Signal Engineer to the Project Leader's plan review distribution list or by sending the plan sheets to the Traffic Signal Engineer directly.

2.6.2 Non-ODOT Let Projects & Consultant Signal Designers

For non-ODOT let projects (local agency or development projects) and consultant designed plans (ODOT let project that is designed by a consultant) an ODOT point of contact will be responsible for plan review distribution of plans to other ODOT personnel. They are typically not responsible for maintaining the project development schedule, only coordinating the review period when the designer deems the plans ready for review. The main point of contact (Region Traffic, Local Agency Liaison, Project Leader, or District Office) will vary depending on the project type and which region and district the project is located in.

Submit the plans to the designated ODOT point of contact who will forward the plans to the Traffic Signal Engineer for review. The Traffic-Roadway Section will then submit comments back to the signal designer through the designated ODOT point of contact. Direct contact can be made to the Traffic-Roadway Section regarding the plan review and Traffic-Roadway Section comments; in fact, the designated ODOT point of contact may encourage direct contact regarding the technical details of traffic signal design rather than being a "middle man". However, the ODOT point of contact should always be kept in the loop of decisions made.

2.7 Getting TRS Drawing Numbers

Each signal related plan sheet is issued a unique TRS Drawing Number that is assigned by the Traffic-Roadway Section. This is how the plan sheets are archived. The sheet number directly relates to the age of the project; the lower the number, the older the plan sheet.

TRS Drawing numbers should be requested by the signal designer once the final number of plan sheets for a project is known and highly unlikely to change (typically near the end of the design process). For projects stored in ProjectWise, this is done by sending the Traffic Signal Engineer a link to the current signal plans in ProjectWise. For projects outside of ProjectWise, this is done by contacting the Traffic Signal Engineer and sending a PDF document (preferred) or hard copy of each plan sheet on the project that needs a drawing number. Drawing number requests are a high priority; they are processed as soon as possible, often within hours of the request.

2.8 Getting the Design Approval Signature

Each signal related plan sheet shall contain a signature block for “Traffic Section Approval”. When all comments on the signal plans have been resolved to the Traffic Signal Engineer’s satisfaction the final plans are either digitally signed by the Engineer of Record or printed on mylar and wet signed by the Engineer of Record.

When signing plans digitally, the Engineer of Record must add the digital signature field for the Traffic Section Approval Block before digitally signing the plans. Otherwise, the Engineer of Record’s signature will be invalidated. Once the plans have been digitally signed, send a link for the signed plans to the Traffic-Roadway Section for the approval signature.

When signing plans on mylar with a wet signature, the Engineer of Record will sign the plans and then send them to the Traffic-Roadway Section for the approval signature.

The approval signature is required to be either the Traffic Signal Engineer or person(s) that are authorized by the Traffic Signal Engineer (typically a member of the Traffic Signal Standards Unit). See Figure 2-4 for authorized signatures.

Figure 2-4 | Authorized Signatures

Scott Cramer

Katryn Johnson

Joe Searcy

2.8.1 ODOT Let Projects

For digitally signed plans, send a link for the digital signed plans to the Traffic-Roadway Section for approval digital signature. Once signed, the Traffic-Roadway Section will inform the signal designer.

For mylars with a wet signature, submit one set of sealed mylars to the Traffic-Roadway Section for the approval signature. Once signed, the Traffic-Roadway Section will return the mylars to the signal designer.

Follow the procedures as per the Office of Project Letting for getting the project finished and distributed.

2.8.2 Non-ODOT Let Projects

Submit two sets of sealed mylars to the Traffic-Roadway Section for the approval signature. Once signed, one set will be retained by the Traffic-Roadway Section for archiving and the other set will be returned to the signal designer for plan set distribution and non-ODOT archiving.

Not having an Authorized Signature on your plan sheets can delay the project bid let date

2.9 Review by Others

In addition to the review and approval from Traffic-Roadway Section, plan sheets should also be reviewed by Region Traffic, Region Electricians, the Construction Office, and any other interested parties (e.g. local agency, historic committees, etc.). Due to the flexibility for some design elements based on Region Electrical Crew preferences (as described in this manual), it is critical to coordinate with the Electrical Crew during the design phase to ensure maintenance concerns are addressed and documented. To accomplish this, download the Electrical Crew Preferences Documentation from Chapter 24 and follow the directions.

The signal designer is responsible for ensuring the plans are distributed to the appropriate parties for review, with one exception; a consultant signal designer working on ODOT let project or a project by permit (e.g. development project) where an ODOT point of contact has been established. The ODOT point of contact will be responsible for ensuring the plans are reviewed by the appropriate **ODOT** personnel.

While the Traffic-Roadway Section makes every attempt to produce comments that do not conflict with other ODOT review comments, it does happen. If other reviewer's comments conflict with the comments received from the Traffic-Roadway Section, it is best to discuss the issue with both parties to determine the appropriate action to take. The conflicting comments may have a simple resolution, such as an incorrect assumption of which standard should be applied to the project because a project narrative was not included with the plan review. Or

the conflicting comments may require more discussion to resolve, such as need to move a crosswalk location or change the signal phasing from what the operational approval requires.

A review by either the signal designer's crew lead or another designer is recommended for the following items, as they are not included in the Traffic-Roadway Section review:

- Quantities and cost estimate
- Special Provision Boiler Plates. Note that the Special Provision boiler plates are only checked and approved by the Traffic Signal Engineer (technical owner of the traffic signal specifications) if you have made any non-standard changes. The Traffic Signal Engineer only reviews and approves the portion of the special provisions where the non-standard change was made. See Chapter 19 for more information on Specifications.