California High-Speed Train Project

In Progress Draft
TECHNICAL MEMORANDUM

Designer's Responsibilities and Utility Requirements for 15% Design Level
TM 2.7.4

Prepared by:	*Signed document on file* Hadi Samii, PE	1 Nov 08 Date
Checked by:	*Signed document on file* John Chirco, PE	10 Nov 08 Date
Approved by:	*Signed document on file* Ken Jong, PE, Engineering Manager	12 Nov 08 Date
Released by:	*Signed document on file* Anthony Daniels, Program Director	20 Nov 08 Date

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System Level Technical and Integration Reviews

The purpose of the review is to ensure:

- Technical consistency and appropriateness
- Check for integration issues and conflicts

System level reviews are required for all technical memoranda. Technical Leads for each subsystem are responsible for completing the reviews in a timely manner and identifying appropriate senior staff to perform the review. Exemption to the System Level technical and integration review by any Subsystem must be approved by the Engineering Manager.

System Level Technical Reviews by Subsystem:

Systems:	*Signed document on file*	10 Nov 08
	Eric Scotson	Date
Infrastructure:	*Signed document on file*	10 Nov 08
	John Chirco	Date
Operations:	*Signed document on file*	10 Nov 08
	Paul Mosier	Date
Maintenance:	*Signed document on file*	10 Nov 08
	Paul Mosier	Date
Rolling Stock:	*Signed document on file*	10 Nov 08
	Frank Banko	Date

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ABSTRACT

This Technical Memorandum provides guidance on the responsibilities and expectations for advancing the design of utilities to the 15% Design Level for the California High-Speed Train Project (CHSTP). This guidance offers standards and procedures for the location, assessment, protection and placement of underground and overhead utilities located within and in proximity of the California High-Speed Rail Authority right of way. Particular emphasis is placed on early identification, disposition and documentation of existing and proposed major utilities that may impact CHSTP construction or operational activities.

The approach for assessing and addressing utility impacts is broadly based on the desire to limit the number of transverse encroachments, eliminate longitudinal encroachments, and prevent any maintenance of utilities from within the Authority's right of way. This document does not address storm drains and irrigation systems. Guidance for design and identification of these facilities will be included in separate technical memoranda. Composite drawings for 15% Design Level will include utilities and storm drains on the same plan in order to allow adequate review of potential conflicts.

1.0 INTRODUCTION

1.1 PURPOSE OF THE TECHNICAL MEMORANDUM

This Technical Memorandum provides guidance on the responsibilities and expectations for advancing the design of utilities to the 15% Design Level for the California High-Speed Train Project (CHSTP). It offers standards and procedures for the location, assessment, protection and placement of underground and overhead utilities located within and in proximity to the California High-Speed Rail Authority (Authority) right of way. Particular emphasis is placed on early identification, disposition and documentation of existing and proposed major utilities.

This document does not address storm drains, irrigation systems or requirements to support construction activities. These facilities will be included in separate technical memoranda. Similarly, this document does not address utility issues associated with construction activities.

1.2 STATEMENT OF TECHNICAL ISSUE

The CHSTP will cross numerous high and low risk utilities owned and maintained by various agencies through the length of the project corridor. This Technical Memorandum will provide guidance on the identification and assessment of utilities impacted by high-speed rail construction and for the design of the relocation of existing and proposed utilities. The designer is required to ensure that utility crossings, impacts, and relocations are in compliance with the requirements of California Public Utility Commission, Caltrans, and other Federal, State, Local, and private agencies.

This document does not supersede public and franchise utility agency design requirements. It is intended to serve as a supplement to agency requirements to ensure that minimum design requirements are achieved.

1.3 GENERAL INFORMATION

The design and relocation of utilities shall follow the requirements of the public or private utility owners whose facility will be impacted by CHSTP. In addition, the designers shall comply with the requirements of this Technical Memorandum and those of the California Public Utilities Commission, including but not limited to the General Orders, Public Utility Codes, Rules of Practice and Procedure, and the Policies and Guidelines.

1.3.1 Definition of Terms

The following technical terms and acronyms used in this document have specific connotations with regard to California High-Speed Train system.

Approximate Location	The “approximate location of subsurface installations” being a strip of land not greater than 24-inches on either side of the exterior surface of the subsurface installation. “Approximate Location” does not define the utility depth.
Area of Impact	The area of required utility construction or relocation due to the CHSTP.
Area of Influence	The area parallel to and 900 ft transverse to the centerline of the nearest track, or as defined in the Environmental Document, whichever is greater
Betterment	Improvements to the capacity and/or functionality of a utility system that is not required for safety, operation and construction of CHSTP.
Controlled Access	Full or partial restriction of the access of owners or occupants of abutting land to or from a highway and/or railway.
Dry Utility	A wire, cable, pipeline, or support facility used to convey electricity, natural gas, gaseous chemicals, telecommunications, cable television, or other non-liquid products.

High Risk Utility	Facilities conducting or carrying the following materials, whether encased or not, are considered to be High Risk Facilities: 1. Petroleum Products 2. Oxygen 3. Chlorine 4. Toxic or flammable gases or liquid 5. Natural gas pipelines of any size 6. Underground electric supply lines, conductors or cables that have a potential to ground of more than 300 volts, either directly buried or in duct or conduit, which do not have concentric grounded or other effectively grounded metal shields or sheaths. 7. Water in pressured pipeline 8. Other utilities that could disrupt the operation of CHSTP
Low Risk Utility	All other facilities that are not noted above are considered to be Low Risk Facilities
Longitudinal	A facility located parallel to and within highway or railway right of way.
Major Utility	Any subsurface, above ground, or overhead facility used for transmission, regardless of size, shape, or method of conveyance.
Minor Utility	Any subsurface, above ground, or overhead facility used as distribution lines or service laterals to individual parcels or properties
Owner	The owner of the utility or its authorized agent.
Pothole / Test Pit	An excavation to expose an underground facility.
Private Utility	Utility infrastructure owned by a private corporation or public or private entities. They may not be regulated by the public or government agency.
Probe	Rods physically inserted in the ground to mechanically or electronically locate an underground facility without exposing the facility.
Public Utility	Utility infrastructure that are operated and maintained for public service. Public Utilities can be either publicly or privately owned and involve natural monopolies in sectors specially regulated by the California Public Utilities Commission.
Quality Level	A level of accuracy scale used for identifying the location of underground and above ground utility facility, used to develop capital projects, and for acquiring and managing that level of information during the project development process. Four Levels of Quality Measurement are used ranging from Level A to Level D.
Relocations	The removal, rearrangement, and reinstallation of a utility facility required by a transportation improvement project.
Right of Way	A general term for a strip of land, or rights in a strip of land, used for highway, railway, public utility services, or other purposes. The right of way line of a freeway or railway is usually the access control line.
Service	The portion of the electrical, gas, water, sewer and communication system that connects a customer, usually at the meter location, to the utility distribution or supply system.
Sleeve	A pipe in which a pipeline or conduit is inserted.
Transverse	A facility passing from one side of the right of way to the other side of the right of way.
Wet Utility	A pipeline that conveys liquid through gravity and/or pressurized systems.

Acronyms

AAR	Association of American Railroads
AREMA	American Railway and Maintenance-of-Way Association
Caltrans	California Department of Transportation
Authority	California High-Speed Rail Authority
CHSTP	California High-Speed Train Project
CPUC	California Public Utilities Commission
GO	General Order
CFR	Code of Federal Regulations
DEIR/S	Draft Environmental Impact Report / Statement
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HDM	Caltrans Highway Design Manual
kPa	Kilo Pascal
mm	Millimeter
m	Meter
psig	Pounds per Square Inch Gauge
PUC	Public Utilities Commission
PDPM	Caltrans Project Development Procedures Manual
QL_	Quality Level

1.3.2 Units

The California High-Speed Train Project is based on U.S. Customary Units consistent with guidelines prepared by the California Department of Transportation and defined by the National Institute of Standards and Technology (NIST). U.S. Customary Units are officially used in the United States, and are also known in the US as “English” or “Imperial” units. In order to avoid confusion, all formal references to units of measure should be made in terms of U.S. Customary Units.

Guidance for units of measure terminology, values, and conversions can be found in the Caltrans Metric Program Transitional Plan, Appendix B U.S. Customary General Primer (http://www.dot.ca.gov/hq/oppd/metric/TransitionPlan/Appendice-B-US-Customary-General-Primer.pdf). Caltrans Metric Program Transitional Plan, Appendix B can also be found as an attachment to the CHSTP Mapping and Survey Technical Memorandum.

2.0 STATEMENT OF TECHNICAL TOPIC

2.1 GENERAL

In preparing the 15% Design Level plans, the designer shall follow the requirements of this technical memorandum and the following documents:

- California Department of Transportation, Highway Design Manual
- California Department of Transportation, Project Development Procedures Manual
- California Public Utility Commission General Orders, Public Utility Codes, Rules of Practice and Procedure, and the Policies and Guidelines.
- The Manual for Railway Engineering of the American Railway Engineering and Maintenance of Way Association (AREMA Manual)

2.2 POLICY CONSIDERATIONS

Development of 15% Design Level plans shall consider the following categories of utility impacts:

1. Existing utilities located within the existing or proposed right of way
2 Proposed utilities to be located within the existing or proposed right of way
3 Proposed utilities required for the operation of CHSTP
4 Proposed temporary utilities required for construction of CHSTP

2.2.1 Utility Agreements and Cost of Relocation

The Authority may develop a Cooperative Agreement with other pubic agencies that includes relocation of utilities within these other public agencies' right of way and which is governed by a franchise agreement.

The Authority may enter into Cooperative or Highway Improvement Agreements with public or private entities in order to facilitate utility relocation or modification efforts. Such agreements will generally be entered into where a utility entity's facilities are impacted at multiple locations along the alignment.

For the purpose of developing construction cost estimates for the 15% Design Level, the designer shall assume that all costs that are attributed to relocation and modification of utilities will be borne by the Authority. Where franchise agreements exist, the allocation of cost will be governed by the terms of the agreement.

2.2.2 Betterments

Utility betterments are not a part of the CHSTP. The basis for design shall be related directly to the design, construction, and operations of CHSTP and shall not be used by utility agencies/owners for betterments to existing facilities. If betterments are proposed by utility agency/owners, separate discussions and negotiations between said agency and Authority may be entered and incorporated with Authority approval. Where there are existing franchise agreements with impacted public or private utility owners, requirements of such agreements shall be reviewed for conformance.

2.2.3 Right of Way Encroachment

An encroachment is defined as any structure or object that is within the high-speed rail right of way and is not a CHSTP facility. Encroachments allow temporary or permanent use of Authority right of way by a utility, a public entity, or a private party. Encroachments include all public and private utilities within the right of way.

CHSTP policy is to exclude access to public and private utilities from within the access controlled high-speed rail right of way at all locations where it is feasible and reasonable. This policy is

intended to provide a safe environment for operation of CHSTP, minimize the disruption to the traveling public, and assure safety of utility employees during maintenance of utility facilities.

Utilities that transport hazardous materials will not be allowed in a railroad tunnel under any circumstances.

Encroachment Justifications

Access to utilities from within the Authority's right of way is considered to be an exception to policy.

Where longitudinal or transverse encroachments and installations are required, the designer must assure Authority of all of the following:

- An alternate location is not feasible, from the standpoint of providing efficient utility services in a manner conducive to safety, durability, and economy of maintenance and operations.
- The accommodation will not adversely affect the design, construction, operation, maintenance, safety, or stability of the railway facility.
- The accommodation will not interfere with or impair the proposed use or future expansion of the railway facility.
- The disapproval of the use of the right of way would result in an immitigable impact to the owner, the environment, or the public.
- The utility be located in such a manner that it can be serviced, maintained, and operated without being accessed from the railroad right of way and will not adversely affect safety or cause damage to the Authority facility.

Longitudinal Encroachments

Existing Utility Longitudinal Encroachments

Longitudinal utility encroachments within the railroad right of way are considered on a case-by-case basis.

Existing longitudinal utilities located within the existing or proposed right of way shall be relocated to the outside of the right of way unless they can be shown to meet the encroachment justification requirements noted above.

New Utility Longitudinal Encroachments

New non-CHSTP utilities will not be permitted to be installed longitudinally within the access controlled areas of the CHSTP. This provision is established to provide the maximum degree of safety and to preserve railroad operations, both of which are warranted by both public and private fund investments in the CHSTP.

Transverse Encroachments

New utility installations, and adjustments or relocation of existing utilities, may be permitted to cross the Authority right of way. To the extent feasible and practicable, they should cross on a line generally normal to, but not less than 60^{o} (degrees) from the railroad longitudinal alignment. Transverse crossings that are at less than 60^{o} from the railroad longitudinal alignment shall be classified as longitudinal encroachment.

Transverse utility encroachments shall comply with the encroachment justification requirements noted above.

Air space leases for wireless communications facilities fall under the general guideline for transverse encroachments and shall be reviewed and approved by the Authority.

2.3 LAWS AND CODES

Initially, high-speed rail design criteria will be issued in technical memoranda that provide guidance and procedures to advance the preliminary engineering. When completed, a CHSTP Design Manual will present design standards and criteria specifically for the design, construction and operation of high-speed railways based on international best practices.

Criteria for design elements not specific to HSR operations will be governed by existing applicable standards, laws and codes. Applicable local building, planning and zoning codes and laws are to be reviewed for the stations as they may be located within multiple municipal jurisdictions, state rights-of-way, and/or unincorporated jurisdictions.

In the case of differing values, the standard followed shall be that which results in the satisfaction of all applicable requirements. In the case of conflicts, exception documentation for the conflicting standard is to be prepared and approval is to be secured as required by the agency requiring an exception, whether it is an exception to the standards of CHSTP or another agency.

2.4 APPLICABILITY TO CODE OF FEDERAL REGULATIONS

To follow.

2.5 CLEARANCE REQUIREMENTS

The minimum requirements for utility clearance shall be as defined by the California Public Utilities Commission, Caltrans HDM and PDPM, AREMA, owners' requirements and this Technical Memorandum. The designer shall use the most stringent and conservative clearance requirements as determined from these documents. These requirements apply to CHSTP related facilities as well as those owned by others.

2.5.1 Underground Utilities

Underground facilities located within the right of way except for electrical and communication lines must be located within a steel casing pipe (3/8" minimum thickness) with welded joints. Where a portion of the line crosses under the tracks or is located within 45 feet of the nearest track centerline, it must meet the requirements of Exhibit A. When the facility or portions of it do not come closer than 45 feet from the nearest CHSTP track centerline, requirements for encasement and burial depths shall be determined on a case-by-case basis. In addition, high and low risk facilities shall comply with the following requirements:

<u>High Risk facilities</u>

- Maintain 500 feet minimum horizontal separation from other High Risk facilities
- Maintain 5 feet minimum horizontally separation from other Low Risk facilities
- Maintain 20 feet minimum horizontal separation from load carrying structural elements

<u>Low Risk facilities</u>

- Maintain 3 feet minimum horizontal separation from other Low Risk facilities
- Maintain 5 feet minimum horizontal separation from load carrying structural elements and 3 feet minimum horizontal separation from other structures
- Maintain 1 foot minimum vertical separation from drainage conduits

The above clearances are minimum requirements. The designer shall verify the adequacy of these standards. Deviation from standards requires design exceptions.

Electrical and communication lines within the right of way must comply with the above requirements except that a duct bank can be used in lieu of steel casing pipe. All underground electrical facilities within the planned construction area must meet the minimum clearance requirements as defined in CPUC General Orders.

Typical clearance requirements for underground utilities are illustrated in Appendix A.

2.5.2 Overhead Utilities

Except for electrical and communication lines, overhead utilities shall cross the tracks at local street overpasses. Such utilities shall either be contained within the overpass structure, or if it is attached to the outside of the overpass structure, it will be encased in a steel casing sleeve. Where electrical and communication lines cannot be accommodated in an overpass structure, their design shall be governed by the requirements of CPUC General Orders.

2.5.3 Above Ground Utilities

In exclusive Authority right of way, all above ground utilities shall be moved outside of the right of way or conform to the requirements of Sections 2.5.1 and 2.5.2, “Underground Utilities” and “Overhead Utilities”. In shared corridors, where design and location of existing utilities may be governed by existing agreements, and where relocation of the utility will have significant impact with respect to cost, environment or public inconvenience, the designer shall investigate the use of fencing, walls, cages, or other sources of protection in order to separate or isolate the utility from CHSTP features.

2.5.4 Exempt Utilities

All utilities shall follow the guidelines set forth in this document. Exemptions from these requirements will not be permitted. Where the requirements of this technical memorandum can not be met, the Design Variance process shall be followed. The Design Variance process is presented in Technical Memorandum.1.1.8 – Design Variance Guidelines.

2.5.5 Location of Proposed Utilities

To the extent that is reasonable and feasible, proposed utilities that are not related to the operation and maintenance of CHSTP shall be located outside the Authority right of way. The location, design, and construction of relocated or proposed utilities shall meet the requirements of CPUC General Orders and the provisions of this Technical Memorandum.

3.0 ASSESSMENT/ANALYSIS

3.1 GENERAL

In general, the identification of potential utility conflicts shall be coordinated with the Owner. The designer shall be responsible for identifying and assessing potential impacts and determining the limits of relocation. Although the designer is required to review and implement the agency codes, requirements and guidelines, coordination of the proposed design with the agency will not be required for development of 15% Design Level plans. To the extent that information is available, proposed utilities should be shown on composite plans along with existing utilities.

3.2 IDENTIFYING AND LOCATING EXISTING UTILITIES

The CHSTP requires the identification of all major public and private utility facilities situated within the area of influence of CHSTP. Existing minor utilities need not be shown on 15% Design Level plans. Where the estimated area of impact to a utility goes beyond the area of influence, the plans should show the location of such utilities for a distance of 300 feet beyond the limits of impact.

Public, private, major and minor utilities are defined as follows:

- Public utilities are utility infrastructures that are operated and maintained for public service. Public Utilities can be either publicly or privately owned and involve natural monopolies in sectors specially regulated by the California Public Utilities Commission.
- Private utilities are utility infrastructures owned by a private corporation or public or private entities and may not be regulated by the public or government agency.
- Major utilities are any subsurface, above ground, or overhead facility used for transmission, regardless of size, shape, or method of conveyance.
- Minor utilities are defined as any subsurface, above ground, or overhead facility used as distribution lines or service laterals to individual parcels or properties

The designer shall research, investigate, and document public and private utility records available for the location of proposed major utility facilities, easements, and ownership.

3.3 IDENTIFYING AND LOCATING PROPOSED UTILITIES

Limited information may be available for utilities proposed by utility owners. The requirements for locating and the design of proposed utilities by others within Authority right of way shall follow the requirements of this Technical Memorandum, particularly pertaining to the encroachment requirements of proposed utilities.

3.4 IDENTIFICATION OF PROPOSED UTILITIES FOR OPERATION OF CHSTP

The CHSTP will require the installation and use of major and minor utility facilities, including electricity, telecommunications, television cable, water, wastewater, gas and petroleum facilities for the operation, maintenance, and communication of trains, stations, and rail facilities.

The designer shall identify proposed utility service lines to CHSTP facilities. The designer shall develop a naming convention for all new utilities for ease of identification and documentation. All required service lines shall be tabulated by location, type and size.

3.5 IDENTIFICATION OF PROPOSED UTILITIES FOR CONSTRUCTION

Limited information may be available to the designers for identifying utility needs of the CHSTP during construction. In urban areas, utilities will be readily available and the impacts of developing points of connection may be limited. In the less developed areas, where a required point of connection may be miles away, the impacts will be greater and attempt should be made to account for this. At a minimum, the design shall provide a tabulation of the proposed points of

connections and provide conceptual assumptions on the continuation of these services along the alignment and/or to the construction staging areas.

3.6 QUALITY LEVELS FOR LOCATING UTILITIES

A Quality Level criterion has been established in order to accurately identify the quality of subsurface and above ground utility facility information needed to develop this project. The Quality Level system will be used for acquiring and managing the level of information during the project development process. Four quality levels of subsurface and above ground utility facility information are recognized as follows:

- Quality Level A: Quality Level A represents the highest degree of accuracy. The information shown on the plans has been obtained by the actual exposure (or verification of previously exposed and surveyed utility facilities) of subsurface utilities, using excavation equipment to determine their precise horizontal and vertical positions as well as other utility facility attributes. (Denoted as QLA).
- Quality Level B: Quality Level B represents the second highest degree of accuracy. The information shown on the plans has been obtained through the application of appropriate surface geophysical methods (i.e. underground cameras, radar, sonar, tone-outs, etc.) to identify the existence and appropriate surveyed horizontal position of subsurface utility facilities. Quality Level B data are reproducible by surface geophysics at any point of their depiction. No excavations to expose utilities are performed. (Denoted as QLB).
- Quality Level C: Quality Level C represents the third highest degree of accuracy. The information shown on the plans has been obtained by surveying and plotting visible above-ground utility features and by using professional judgment. (Denoted as QLC).
- Quality Level D: Quality Level D represents the lowest degree of accuracy. The information shown on the plans was derived solely from existing as-built plans, Caltrans records, and/or utility agency records or recollections. (Denoted as QLD).

Quality Level D shall be the basis for acquiring utility information for the 15% Design Level phase of the CHSTP. If a potential utility conflict is identified for which additional location information is required for the development of the 15% Design Level plans, the designer shall document the need for a higher Quality Level and submit the request to Authority for approval.

In general, where adequate information about the general location of a utility does not exist, the designer can, for the purpose of construction cost estimating, assume total reconstruction of the utility. In cases where the relocation of such utility will cause a significant impact to utility owner, the public, or the environment, QLC or higher may have to be employed. Prior to performing such utility location identification, the designer shall submit the request to and obtain the approval of the Authority.

3.7 DOCUMENTATION OF UTILITY INFORMATION

3.7.1 Utility Company Correspondence

The designer shall directly correspond with utility owners to request as-built utility data within the area of influence of CHSTP. A form letter and a letter from Authority authorizing the designer to request such data will be provided to the designer. In order to determine the extent of any relocation, the designer shall also request design criteria and other ancillary requirements for the establishment of utility line and grade. The designer shall also request information on utilities that the are proposed by the utility owner.

3.7.2 Retention of Records

All documents and correspondence pertaining to utility facilities within the area of influence of the CHSTP, regardless of format (i.e., email, paper, etc.), shall be stored in the project files and

record log shall be maintained, updated and made available upon request. The log shall include the name, address, and contact information for the owners of utilities located within the area of influence of CHSTP. It will also list the initial and subsequent dates that the correspondence occurred and identify any material sent or received. Sample Utility Owner Contact Information and Utility Owner Contact Log matrices are provided in Appendices B-2 and B-3, respectively.

Electronic files, including emails, drawings, and other documentation shall be maintained as part of the retention of records. If during the course of the project, the Authority establishes specific document control procedures for the CHSTP, the designer shall update and revise the log to follow the established protocol.

3.7.3 Composite Plans

Existing, relocated, and new utilities shall be shown on a master utility CADD file and shall be plotted on a composite improvement plan for the overall project. Preparation of separate utility plans will not be required. The composite drawing will show major project features, including other subterranean infrastructure. These composite drawings will be used to initiate discussions with utility agencies and owners after the completion of 15% Design Level plans.

The 15% Design Level shall identify existing major utilities, proposed utilities, potential conflicts with construction and operation of the CHSTP, and the probable limits of utility relocation. The limit of impact to the utilities shall be used as the basis for cost estimating effort. Detailed design, mitigation, and disposition of utilities will be part of subsequent design phases.

3.7.4 Utility Inventory with Preliminary Disposition

The designer shall compile a matrix of all existing, relocated, and new utilities. The matrix shall identify any potential conflict, utility type, location, material, age, and length of the facility. Exhibit 1 in Appendix B provides a sample matrix.

3.8 ASSESSING UTILITY IMPACTS

The designer shall protect, adjust, or relocate existing utilities based on the requirements for accomplishing the design, construction, and operations of the railroad facilities.

3.8.1 Identification of Impacts

For utilities requiring relocation, removal, installation, or other impacts associated with the CHSTP, the plans shall identify the approximate limits of the anticipated impact. The 15% Design Level shall provide sufficient information regarding the limits of impact in order to allow for agency and utility owner reviews, obtain planning level approvals, and determine the cost of relocation or protection.

3.8.2 Relocation

To the extent that it is reasonable and feasible, utilities located within the Authority's right of way shall be relocated to outside of the right of way. Relocation of utilities should be limited to areas in direct conflict with the CHSTP design and right of way, but may require the complete abandonment or removal and the reconstruction of a utility facility.

3.8.3 Adjustment and/or Protection of Existing Utilities within the HSR ROW

Where it is not reasonable and feasible to remove, relocate, and/or abandon an existing utility that is located within the right of way, adjustment and/or protection of the utility may be required. Adjustment and/or protection of subsurface, above ground, or overhead facilities to accommodate the CHSTP should be limited to the areas of impacts directly associated with the design and construction of the CHSTP. The designer shall make adjustments and/or protect the utility components for permanent and temporary CHSTP facilities which may include the reconstruction of certain elements within the right of way to accommodate the permanent rail and ancillary features.

3.8.4 Abandonment of Utilities

Utilities that are to be abandoned shall be shown on plans. Abandonment shall identify whether the facility is being abandoned in place, and whether the abandoned facility is to be partially removed or entirely removed.

3.8.5 Probable Construction Quantities and Costs

The design engineer will prepare an estimate of probable quantities for utility impacts which will include, but not be limited to temporary and permanent utility relocations, temporary and permanent protection, adjustments, encasements, removals of utility features, easements, and right of way. The quantity estimate should include utility requirements during construction.

The quantity estimate should include identification of appropriate materials and units of measurement. Unit costs, contingencies, and other pricing requirements shall be addressed in a separate technical memorandum.

3.8.6 Permitting and Approvals

The designer shall anticipate that various utility agency permits or approvals will be required. The designer shall be responsible for investigating, identifying, and transmitting these requirements for each agency to the Authority as part of the 15% Design Level. Completion of permit applications will be part of a subsequent design phase. Designers shall document the requirements of utility owners and the need for required utility improvement agreements, cooperative agreements or interagency agreements.

3.8.7 Construction Activities, Staging and Sequencing

The construction staging and sequencing of the CHSTP will need to be closely coordinated with the utility agencies/owners where protection, adjustments, or relocations are required. The designer shall consider probable construction activities and make provisions to avoid or minimize utility impacts during construction operations.

Where temporary utility protection, adjustments, or relocations are required to successfully complete the construction of the railroad, ancillary features, permanent utilities, or other project elements, the designer shall develop 15% Design Level sketches or plans to adequately estimate costs and enable owner/agency review of and concurrence with the proposed facilities. No disconnection or suspension of distribution for major utilities will be permitted without concurrence and approval by the owning utility agency/owner and/or the CPUC. Temporary relocation of utility features that require long lead times should be avoided.

3.8.8 Beyond 15% Design Level Plans

The focus of this technical memorandum and that of 15% Design Level plans is assessment of impacts to major utilities. However, identification and assessment of minor utilities will be required during subsequent phases of the project. In order to limit multiple requests for as-built information and proposed plans from utility owners in a specific area of influence, it is recommended that designers do not limit their request to major utilities. Upon receipt of information on minor utilities, the designer shall document such data for future retrieval. It is possible that certain owners will provide all of their as-built data in GIS format. This technical memorandum does not limit the information to be shown on plans for major utilities.

4.0 SUMMARY AND RECOMMENDATIONS

The general guidance provided in this Technical Memorandum is that where it is reasonable and feasible, utilities should be removed and/or relocated to outside of the Authority right of way. Where utilities are to remain within the right of way, minimum design criteria adequate for 15% Design Level have been provided in Section 6.0. Where the design criteria provided here conflicts with other referenced material or where the referenced material conflict with each other, the most stringent requirement that satisfies all of the documents and references shall govern. It is also noted that design criteria for utilities is generally developed by each utility owner. Significant effort may be required in urban areas to comply with the requirements of all of the utility owners.

5.0 SOURCE INFORMATION AND REFERENCES

This assessment considered the following criteria:

1. The Manual for Railway Engineering of the American Railway Engineering and Maintenance of Way Association (AREMA Manual), Chapter 1, Part 5 (2002).
2. California Department of Transportation, Highway Design Manual
3. California Department of Transportation, Project Development Procedures Manual
4. California Public Utility Commission, Public Utility Codes
5. California Public Utility Commission, Rules of Practice and Procedure
6. California Public Utility Commission, Policies and Guidelines.
7. California Public Utilities Commission General Order No. 26-D, 28, 95, 103, 112-E, 128 and 131-D
8. Code of Federal Regulations / 49 CFR
9. CHSTP Basis of Design
10. CAHST Design Criteria Draft - 2004
11. CHSTP Technical Memorandum TM 0.5 - Coordination with Caltrans
12. CHSTP Technical Memorandum TM 1.1.8- Design Variance

6.0 DESIGN MANUAL CRITERIA

6.1 UTILITY REQUIREMENTS FOR 15% DESIGN LEVEL

The CHSTP shall follow design criteria of the following documents for 15% Design Level utility engineering design:

- California Department of Transportation, Highway Design Manual
- California Department of Transportation, Project Development Procedures Manual
- California Public Utility Commission General Orders, Public Utility Codes, Rules of Practice and Procedure, and the Policies and Guidelines.
- The Manual for Railway Engineering of the American Railway Engineering and Maintenance of Way Association (AREMA) Manual
- Provisions of this Technical Memorandum
- Requirements of individual utility owners

In the case of differing values, the standard followed shall be that which results in the satisfaction of all applicable requirements. In the case of conflicts, exception documentation for the conflicting standard is to be prepared and approval is to be secured as required by the agency requiring an exception, whether it is an exception to the standards of the CHSTP or another agency.

6.2 RIGHT OF WAY ENCROACHMENT

An encroachment is defined as any structure or object of any kinds which is within the right of way but not part of the CHSTP facility. Encroachments allow temporary or permanent use of Authority right of way by a utility, a public entity, or a private party. Encroachments include all public and private utilities within the right of way.

CHSTP policy is, to the extent that is reasonable and feasible, exclude access points for utilities from within access controlled right of way. This policy is intended to provide a safe environment for operation of CHSTP, minimize the disruption to the traveling public, and assure safety of utility employees during maintenance of utility facilities.

Utilities that transport hazardous materials will not be allowed in a railroad tunnel under any circumstances.

6.2.1 Encroachment Justifications

Access to utilities from within the Authority right of way is an exception to CHSTP criteria.

Where longitudinal or transverse encroachments and installations are required, the designer must ensure the following:

1 An alternate location is not feasible, from the standpoint of providing efficient utility services in a manner conducive to safety, durability, and economy of maintenance and operations.

2 The accommodation will not adversely affect the design, construction, operation, maintenance, safety, or stability of the railway facility.

3 The accommodation will not interfere with or impair the proposed use or future expansion of the railway facility.

4 The disapproval of the use of the right of way would result in an immitigable impact to the owner, the environment, or the public.

5 The utility be located in such a manner that it can be serviced, maintained, and operated without being accessed from the railroad right of way and will not adversely affect safety or cause damage to the Authority facility.

Longitudinal Encroachments

Existing Utility Longitudinal Encroachments

Longitudinal utility encroachments within the railroad right of way are considered on a case-by-case basis.

Existing longitudinal utilities located within the existing or proposed right of way shall be relocated to the outside of the right of way unless they can be shown to meet the encroachment justification requirements noted above.

New Utility Longitudinal Encroachments

New non-CHSTP utilities will not be permitted to be installed longitudinally within the access controlled area of the CHSTP.

Transverse Encroachments

New utility installations, and adjustments or relocation of existing utilities, may be permitted to cross the Authority right of way. To the extent feasible and practicable, they should cross on a line generally normal to, but not less than 60^{o} (degrees) from the railroad longitudinal alignment. Transverse crossings that are at less than 60^{o} from the railroad longitudinal alignment shall be classified as longitudinal encroachment.

Transverse utility encroachments shall comply with the encroachment justification requirements noted above.

Air space leases for wireless communications facilities fall under the general guideline for transverse encroachments and are to be reviewed and approved by the Authority which may develop special guidelines for wireless communication facilities.

6.3 CLEARANCE REQUIREMENTS

The minimum requirements for utility clearance shall be as defined by the California Public Utilities Commission, Caltrans HDM and PDPM, AREMA, owners' requirements and this Technical Memorandum. The designer shall use the most stringent and conservative clearance requirements as determined from these documents. These requirements apply to CHSTP-related facilities as well as those owned by others.

6.3.1 Underground Utilities

Underground facilities located within the right of way except for electrical and communication lines must be located in a steel casing pipe (3/8" minimum thickness) with welded joints. Where a portion of the line crosses under the tracks or is located within 45 feet of the nearest track centerline, it must meet the requirements of Exhibit A. When the facility or portions of it do not come closer than 45 feet from the nearest CHSTP track centerline, requirements for encasement and burial depths shall be determined on a case-by-case basis. In addition, high and low risk facilities shall comply with the following requirements:

High Risk facilities

- Maintain 500 feet minimum horizontal separation from other High Risk facilities
- Maintain 5 feet minimum horizontal separation from other Low Risk facilities
- Maintain 20 feet minimum horizontal separation from load carrying structural elements

Low Risk facilities

- Maintain 3 feet minimum horizontal separation from other Low Risk facilities
- Maintain 5 feet minimum horizontal separation from load carrying structural elements and 3 feet minimum horizontal separation from other structures
- Maintain 1 foot minimum vertical separation from drainage conduits

The above clearances are minimum requirements. The designer shall verify the adequacy of these standards. Deviation from standards requires design exceptions.

Electrical and communication lines within the right of way must comply with the above requirements except that a duct bank can be used in lieu of steel casing pipe. All underground electrical facilities within the planned construction area must meet the minimum clearance requirements as defined in CPUC General Orders.

6.3.2 Overhead Utilities

Except for electrical and communication lines, overhead utilities shall cross the tracks at local street overpasses. Such utilities shall either be contained within the overpass structure, or if it is attached to the outside of the overpass structure, it will be encased in a steel casing sleeve. Where electrical and communication lines cannot be accommodated in an overpass structure, their design shall be governed by the requirements of CPUC General Orders.

6.3.3 Above Ground Utilities

In exclusive Authority right of way, all above ground utilities shall be moved outside of the right of way or conform to the requirements of Sections 6.3.1 and 6.3.2, “Underground Utilities” and “Overhead Utilities”. In shared corridors, where design and location of existing utilities may be governed by existing agreements, and where relocation of the utility will have significant impact with respect to cost, environment or public inconvenience, the designer shall investigate the use of fencing, walls, cages, or other sources of protection in order to separate or isolate the utility from CHSTP features.

6.3.4 Exempt Utilities

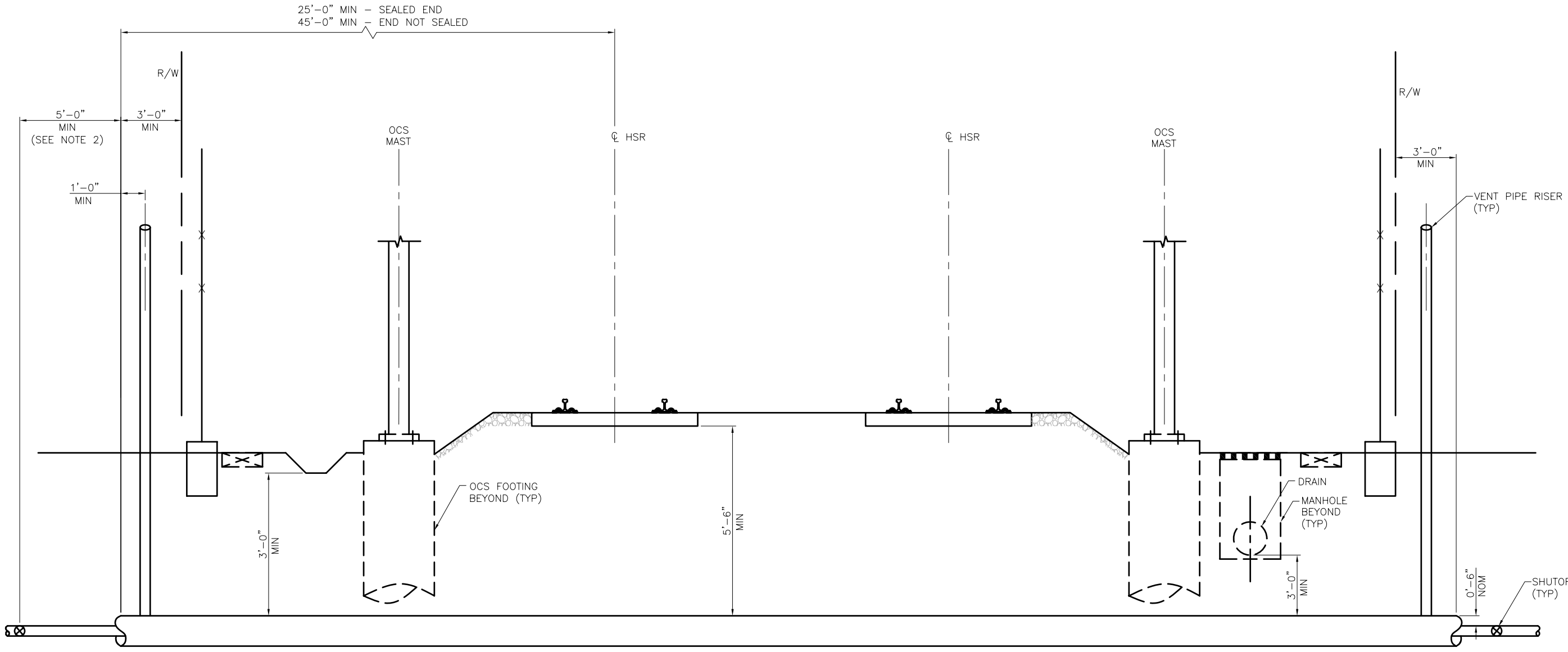
All utilities shall follow the guidelines set forth in this document. Exemptions from these requirements will not be permitted. Where the requirements of this technical memorandum can not be met, the Design Variance process shall be followed. The Design Variance protocol is presented in Technical Memorandum.1.1.8 – Design Variance Guidelines..

6.3.5 Location of Proposed Utilities

To the extent that is reasonable and feasible, proposed utilities that are not related to the operation and maintenance of CHSTP shall be located outside the Authority right of way. The location, design, and construction of relocated or proposed utilities shall meet the requirements of CPUC General Orders and the provisions of the Authority.

APPENDIX A: TRANSVERSE SUBSURFACE UTILITY ENCROACHMENT

EXHIBIT A - TRANSVERSE SUBSURFACE UTILITY ENCROACHMENT



TRAVERSE SUBSURFACE UTILITY ENCROACHMENT
NTS

NOTES:

1. FOR ADDITIONAL REQUIREMENT, SEE AREMA VOL. 1, CHAP. 1, PART 5.
2. SHUTOFF VALVE MUST BE ACCESSIBLE FROM OUTSIDE THE R/W. IT MAY NOT BE REQUIRED ON BOTH SIDES.
3. THE CASING SHALL CONTINUE 3'–0" BEYOND THE R/W LINE.
4. TRANSVERSE UTILITIES SHALL BE SITED AWAY FROM MANHOLES, OCS FOOTINGS, AND OTHER HSR SUBSURFACE ELEMENTS.

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APPENDIX B: SAMPLE UTILITY LOGS

EXHIBIT B-1 UTILITY INFORMATION LOG

EXHIBIT B-2 UTILITY OWNER CONTACT INFORMATION

EXHIBIT B-3 UTILITY OWNER CONTACT LOG

EXHIBIT B-4 UTILITY LOG INDEX

Exhibit B-1
Utility Information Log

No.	Region	Owner	Dwg No.	Station	Facility Type	Size	Units	Length	% Cost Allocation	Disposition

Exhibit B-2
Utility Contact Information

No.	Region	Owner	Contact	Address	City	Zip	Phone	Fax	Email	No. of Impacts	Agreement

Exhibit B-3
Utility Owner Contact Log

No.	Region	Owner	Date	Correspondence Type	Initiated By	Description

Exhibit B-4
Utility Log Index

Heading	Explanation
No.	Sequentially number each entry
Region	Regional Consultant
Owner	Utility Owner
Station	Stationing along the alignment to locate the facility
Facility Type	Type of utility being conveyed
Size	Size of utility facility
Units	Units of measure for the size of utility
Length	Length of utility being impacted-Use separate entries for abandonment and relocated utilities
% Cost Allocation	Percentage of construction cost to be borne by CHSRA (requires input by CHSRA)
Disposition	State the type of work being performed (Abandoned, relocated)
Contact	Name of a contact person representing the Owner
Address	Street Address of the Owner
City	Owner's City location
Zip	Zip Code of the Owner's contact location
Phone	Phone number for Owner's representative
Fax	Fax number for Owner's representative
Email	Email address for Owner's representative
No. of Impacts	Number of utilities belonging to this owner that is being impacted by CHSTP
Agreement	Indicate whether an agreement should be entered into with this owner
Date	Date of contact with Owner
Correspondence Type	Type of correspondence with Owner (phone, fax, letter, email)
Description	Description of the discussion and/or request. Include reference to email or letter dates