



LADOTD

Traffic Signal Standard Details Update

June 25th, 2015

Outline



- Summary of changes between TSD 2009 version and TSD 2015 version
- Overview on the Traffic Signal Mast Arm Specifications and foundation design details for arms longer than 50'(single) and 45'X40' (dual)
- Upcoming TSD that will be published with the new Louisiana Standard Specifications For Roads and Bridges

TSD 2009 vs. 2015



- 2015 TSD is an interim version between now and when the new standard specs book is published
- A few minor revisions.
- Three sheets are added to show longer traffic signal mast arm specifications and details

Revisions



2009

- Sheet 05-pedestrian signal
- Sheet 06-mast arm bracket for signals and signs
- Sheet 07-wiring details for flashing beacon
- Sheet 09

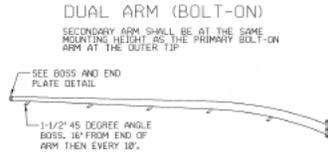
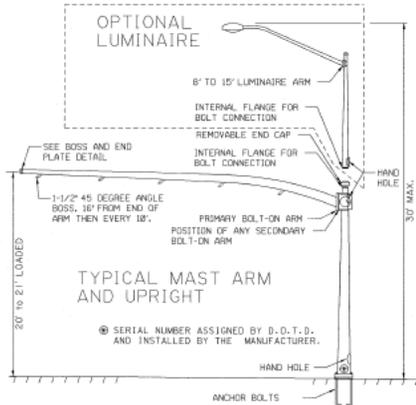
2015

- Sheet 08-count down ped and delete the outdated crossing signs.
- Sheet 09-more drawings
- Sheet 10-delete the drawing
- Sheet 10-add wiring diagram for bridge/railroad preemption

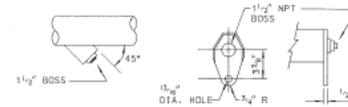
2015 TSD sheet 04



55' SINGLE, 50'X35' DUAL, AND OVER MAST ARM DETAIL

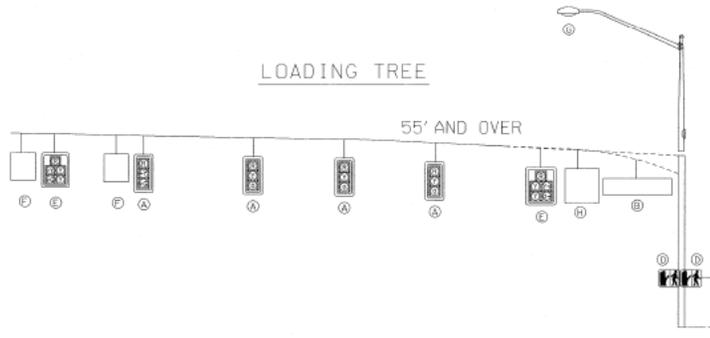


BOSS AND END PLATE DETAIL



- NOTE:
- ALL BOSSES SHALL BE PLUGGED WITH A 1 1/2" GALVANIZED STEEL CONDUIT PLUG WITH A SQUARE HEAD HUB. WHEN CABLE IS ROUTED THROUGH THE BOSS A RUBBER COMPRESSION BUSHING SHALL BE USED TO SEAL AND HOLD CABLE IN BOSS. CABLE SHALL BE SECURED TO MAST ARM FROM BOSS TO SIGNAL HEAD WITH 1/2" WIDE WEATHER RESISTANT TIE WRAPS.
 - TEN (10) CONDUCTOR SIGNAL CABLE FROM CONTROLLER MAY BE SPLICED IN POLE BASE TO TWO (2) - SIX (6) CONDUCTOR SIGNAL CABLES ROUTED TO TWO (2) - THREE (3) SECTION SIGNAL HEADS ON THE MAST ARM. NO OTHER SPLICING SHALL BE ALLOWED.
 - ALL SPLICES SHALL BE MADE WITH AN ALL COPPER OPEN-ENDED COMPRESSION SPLICE CAP INSTALLED TO THE MANUFACTURER'S RECOMMENDED METHOD AND INSULATED. WIRE NUTS SHALL NOT BE ALLOWED!
 - A 1/2" #13NC GROUND LUG SHALL BE REQUIRED AND BE ACCESSIBLE BY THE HAND HOLE.

LOADING TREE



NOTES:
Ⓢ EFFECTIVE PROJECTED AREA

DEVICE	DESCRIPTION	PROJ. AREA (SQ. FT.)	WEIGHT (LBS.)
A) SIGNAL	12" x 3" SEC. SIGNAL W/BACKPLATES	10.40 (Ⓢ)	56
B) SIGN	72" x 18" STREET NAME SIGN	9.00	36
C) SIGNAL	12" x 3" SEC SIGNAL HEAD NO BACKPLATE	4.90 (Ⓢ)	50
D) SIGNAL	DUAL 2 SECTION PEDESTRIAN SIGNAL	8.00 (Ⓢ)	80
E) SIGNAL	12" x 5" SEC SIGNAL WITH BACKPLATES	16.00 (Ⓢ)	85
F) SIGN	24" x 30" REGULATORY SIGN	5.00	20
G) LUMINAIRE	LUMINAIRE	3.30	75
H) SIGN	36" x 36" BLANK OUT REGULATORY SIGN (40" x 40" OVERALL)	11.20	94
I) SIGN	30" x 36" REGULATORY SIGN	7.50	30

DESIGN CRITERIA:
THESE TRAFFIC SIGNAL SUPPORT STRUCTURES SHALL BE DESIGNED IN ACCORDANCE WITH LOADING AND ALLOWABLE STRESS REQUIREMENTS OF 2009 AASHTO "STANDARDS SPECIFICATION FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS", FOURTH EDITION. WIND LOADS ARE BASED ON A BASIC WIND SPEED OF 130 MPH WITH A RECURRENCE INTERVAL OF 50 YEARS AND A FATIGUE CATEGORY OF 2. FATIGUE LOADS ARE BASED ON THE REQUIREMENTS OF SECTION 11.7 AND THE FOLLOWING DESIGN LOADS.

- VORTEX SHEDDING: NOT APPLICABLE FOR STRUCTURES WITH A TAPER OF AT LEAST 0.14"/FT. PER AASHTO.
- NATURAL WIND GUSTS: THE YEARLY MEAN WIND SPEED FOR NATURAL WIND GUSTS WILL BE ASSUMED TO BE 11.2 MPH.
- GALLOPING: STRUCTURES ARE NOT DESIGNED TO RESIST PERIODIC GALLOPING FORCES.
- TRUCK-INDUCED GUST: STRUCTURES ARE NOT DESIGNED TO INCLUDE TRUCK-INDUCED GUSTS.
- ARMS MAY BE CURVED OR STRAIGHT.



PROJECT NUMBER: _____

DATE: _____

NO. _____

REGULATORY DESCRIPTION: _____

TRAFFIC SIGNAL STANDARD DETAILS

55' SINGLE, 50'X35' DUAL AND OVER MAST ARM DETAIL

15SD-04

TRAFFIC ENGINEERING

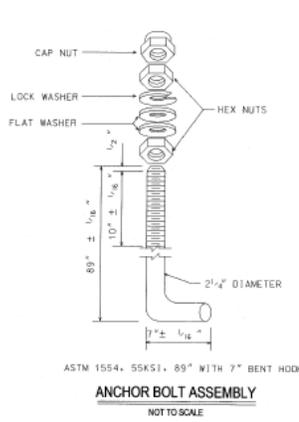
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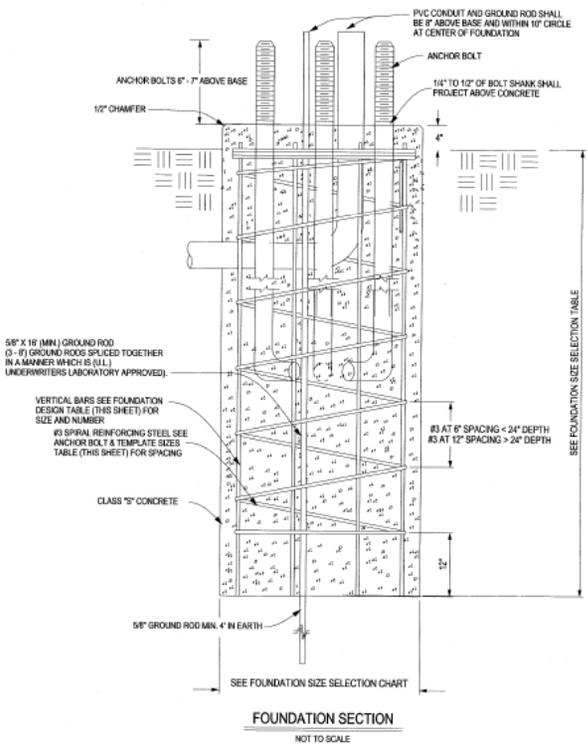
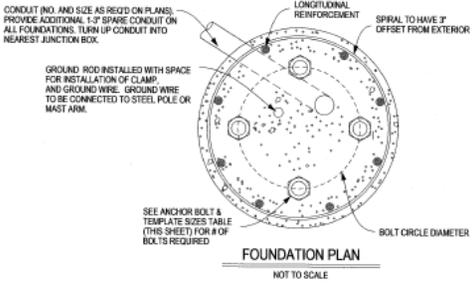
2015 TSD sheet 05



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- GENERAL NOTES:**
1. THREADS FOR ANCHOR BOLTS AND NUTS SHALL BE ROLLED OR CUT THREADS.
 2. THE CONTRACTOR SHALL STATE THE LOCATION OF EACH POLE FOUNDATION AND NOTIFY THE PROJECT ENGINEER FOR CONCURRENCE IN THE LOCATION BEFORE PROCEEDING WITH THE INSTALLATION OF THE POLE FOUNDATION.
 3. ONCE THE POLE FOUNDATION IS INSTALLED, MAST ARM LENGTHS SPECIFIED ON PLANS ARE TO BE VERIFIED BEFORE ORDERING. IF A TIME EXTENSION IS NEEDED, IT SHALL BE AT THE DISCRETION OF THE PROJECT ENGINEER TO GRANT THE EXTENSION.
 4. CONDUIT SHALL BE INSTALLED ACCORDING TO PLANS. CONDUIT SHALL BE CENTERED IN THE FOUNDATION WITH SPACING.
 5. ALL SPARE CONDUIT IN FOUNDATIONS SHALL BE STUBBED OUT 24" BELOW GRADE AND BROUGHT INTO JUNCTION BOX.
 6. TOP OF BASE SHALL BE ROUND WITH CHAMFERED EDGE.
 7. SERVICE CONDUIT SHALL BE 2" DIA. SCH. 80 PVC.
 8. USE A GROUND ROD CLAMP TO ATTACH THE #6 AND #8 GROUND WIRE ONTO THE GROUND ROD AND THE OTHER END TO BE CONNECTED TO THE POLE.
 9. ALL GROUND RODS, REGARDLESS OF FOUNDATION SIZE SHALL PROTRUDE THROUGH THE FOUNDATION AND A MINIMUM OF 4" SHALL BE EMBEDDED INTO THE EARTH.



FOUNDATION SIZE SELECTION CHART
Foundation Size Selection (diameter in inches, length in feet)

Mast Arm Length (ft)	Zone			
	Zone 1 (Diameter/Depth)	Zone 2+ (Diameter/Depth)	Zone 3+ (Diameter/Depth)	Zone 4 (Diameter/Depth)
55	* * *	42 18	36 14	* * *
60	* * *	42 19	36 15	* * *
65	* * *	48 17	36 16	* * *
70	* * *	48 19	36 17	* * *
50 & 35	54 18	36 20	36 23	* * *
50 & 40	54 18	36 20	36 23	* * *
55 & 40	* * *	42 18	36 14	* * *
55 & 45	* * *	42 18	36 14	* * *

* Special Design Required

ANCHOR BOLT & TEMPLATE SIZES

DRILLED SHAFT DIA	REINFORCING STEEL		ANCHOR BOLT DESIGN	
	VERT BARS	SPIRAL SPACING	# OF ANCHOR BOLTS	ANCHOR BOLT DIA
30"	12-#10	#3 AT 6" < 24" DEPTH #3 AT 12" > 24" DEPTH	4	2 1/4"
42"	17-#10	#3 AT 6" < 24" DEPTH #3 AT 12" > 24" DEPTH	6	2 1/4"
54"	28-#10	#3 AT 6" < 24" DEPTH #3 AT 12" > 24" DEPTH	6	2 1/4"



TRAFFIC SIGNAL STANDARD DETAILS
30" SINGLE, 50"x35" DUAL
AND OVER FOUNDATION

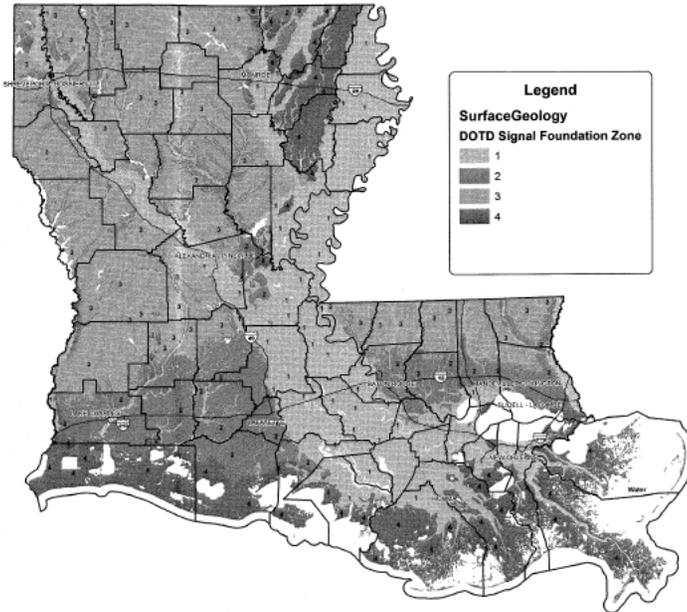
TRAFFIC ENGINEERING

2015 TSD sheet 06



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GENERAL STATIC MAP FOR FOUNDATION REQUIREMENTS SHOWN HERE.
SEE <http://goo.gl/QHv2o3> FOR LOCATION SPECIFIC CLASSIFICATION.
ALTERNATIVE: LADOTD WEBSITE/HOME/INSIDE LADOTD/DIVISIONS/OPERATIONS /TRAFFIC SERVICES/TRAFFIC OPERATIONS/APPROVED PRODUCT LIST/TOAPL 165.



Legend
SurfaceGeology
DOTD Signal Foundation Zone

- 1 [Pattern]
- 2 [Pattern]
- 3 [Pattern]
- 4 [Pattern]

FOUNDATION SIZE ZONING:

- FOUNDATION ZONES ARE BASED ON THE 1984 GEOLOGICAL MAP OF LOUISIANA PUBLISHED BY THE LOUISIANA GEOLOGICAL SURVEY. LOCAL GEOLOGICAL VARIATIONS ARE LIKELY DUE TO HUMAN ACTIVITIES OR NATURAL EVENTS.
- THE ZONING MAP IS INTENDED TO ASSIST IN SIZING FOUNDATION FOR SELECTED SIGNAL POLES AND SHOULD NOT BE VIEWED AS A SUBSTITUTE OF ENGINEERING JUDGMENT OR PROPER DESIGN.
- SOME SOILS SUCH AS GRAVEL OR CEMENTED SOILS MAY NOT BE AMENABLE TO THE CONVENTIONAL DRILLED SHAFT CONSTRUCTION. EXERCISE CAUTION AND SEEK CONFIRMATION OF THE SOIL CONDITIONS DURING DESIGN AND/OR DURING SHAFT EXCAVATION.

ZONE 1 - ALLUVIAL SOILS FORMED BY THE RED RIVER, THE OUACHITA RIVER, THE ATCHAFALAYA RIVER, AND THE MISSISSIPPI RIVER. ASSUMED AVERAGE SOIL SHEAR STRENGTH IS AT LEAST 250 POUNDS PER SQUARE FOOT (PSF).

ZONE 2 - PLEISTOCENE AGE PRAIRIE TERRACES DEPOSITS. ASSUMED AVERAGE SOIL SHEAR STRENGTH IS AT LEAST 500 PSF.

ZONE 3 - PLEISTOCENE AGE OR OLDER DEPOSITS OTHER THAN ZONE 2. ASSUMED AVERAGE SHEAR STRENGTH IS AT LEAST 1,000 PSF.

ZONE 4 - MOSTLY COASTAL MARSH AND SAND/GRAVEL DEPOSITS. SPECIAL DESIGN IS REQUIRED FOR THE SIGNAL POLE WITHIN THIS ZONE.

CONSTRUCTION NOTES:

- IF GROUNDWATER IS ENCOUNTERED DURING FOUNDATION EXCAVATION AND NO CAVE IN IS OBSERVED, THE GROUNDWATER SHOULD BE PUMPED OUT PRIOR TO STEEL CAGE PLACEMENT. THE WATER REMAINS IN THE EXCAVATION SHOULD BE NO MORE THAN 1/2 INCH.
- IF GROUNDWATER IS ENCOUNTERED DURING FOUNDATION EXCAVATION AND CAVE IN IS OBSERVED, THE EXCAVATION SHOULD BE CEASED. CONTACT THE PROJECT ENGINEER IMMEDIATELY. SHOULD THE CAVING IS EXCESSIVE, BACKFILL THE EXCAVATION IMMEDIATELY.
- FREE FALL CONCRETE IS ALLOWED FOR DRY HOLES ONLY. THE CONCRETE SHALL BE PLACED WITH A HOPPER OR A TREMIE. WHEN FREE FALL METHOD IS USED, CONTROL THE CONCRETE TO FALL VERTICALLY WITHOUT CONTACTING SHAFT WALL OR STEEL CAGE TO PREVENT SEGREGATION.
- CONCRETE PLACEMENT WITH A TREMIE IS REQUIRED IF EXCESSIVE GROUNDWATER (MORE THAN 6 INCHES ACCUMULATION) IS ENCOUNTERED.
WHEN THE SOIL CONDITIONS ARE SUSPECTED TO BE DIFFERENT THAN THOSE DESCRIBED IN THE FOUNDATION SIZE ZONING, CONTACT THE PROJECT ENGINEER IMMEDIATELY TO EVALUATE THE SUITABILITY OF THE FOUNDATION DESIGN.

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SHEET NUMBER		PROJECT	
DESIGNED BY	CHECKED BY	DATE	PROJECT
DRAWN BY	DATE	PROJECT	
REVISION DESCRIPTION			
NO.	DATE		
TRAFFIC SIGNAL STANDARD DETAILS SINGLE TOWER AND OVERCAST ARM DETAIL POLE FOUNDATION DETAILS TSD-06			
TRAFFIC ENGINEERING			





Mast Arm Specs overview

- For mast arms 50' or shorter singles and 45' by 40' or shorter duals: no change in specifications or foundation design
- For longer mast arms, the poles have to be on the Traffic Operations Approved Product List (TOAPL). [Traffic Services](#)
- Foundation design varies depending on soil type shown in sheet 05 2015. soil zone map is a interactive GIS based map on [LADOTD Traffic Services website.](#)



Questions?