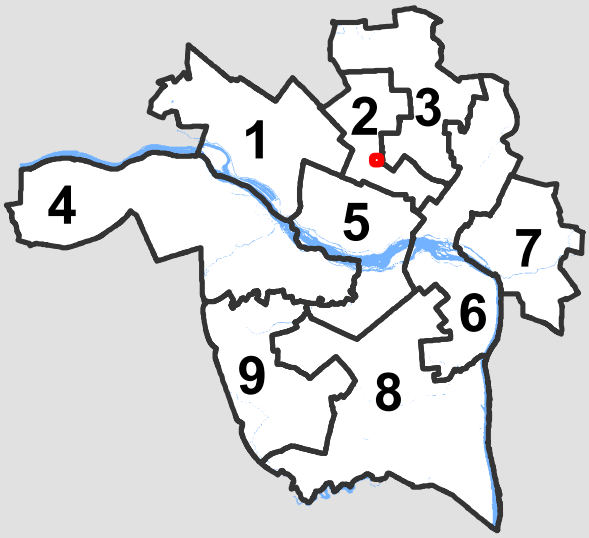
City of Richmond
Department of Planning & Development Review

Encroachment

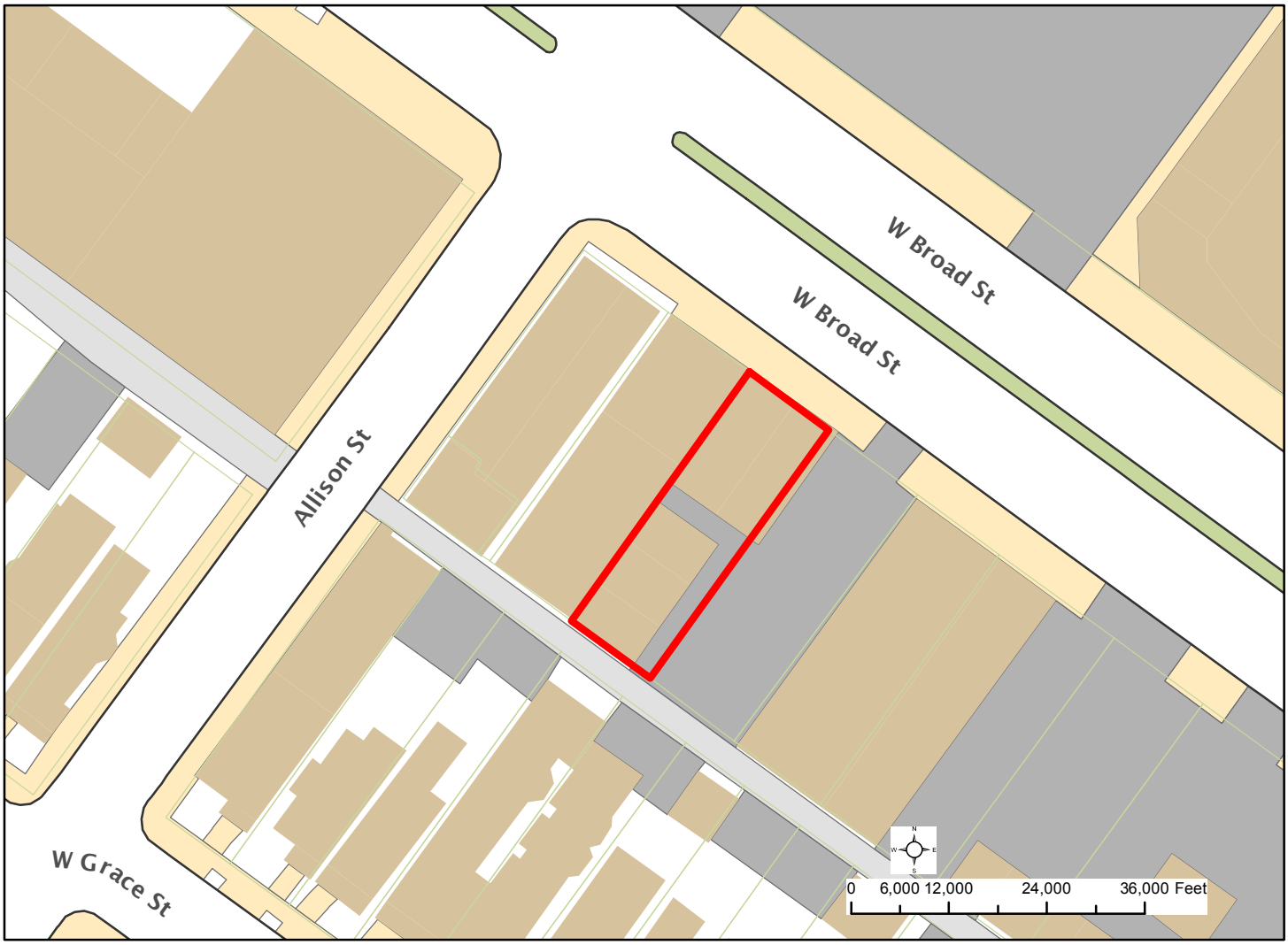
LOCATION:
2043 W. Broad St.

COUNCIL DISTRICT: 2

PROPOSAL: Review of a pilot encroachment associated with festoon lighting at 2043 W. Broad St.



For questions, please contact Josh Son at 646-3741 or joshua.son@richmondgov.com



Application for URBAN DESIGN COMMITTEE Review

Department of Planning and Development Review
Planning & Preservation Division
900 E. Broad Street, Room 510
Richmond, Virginia 23219
(804) 646-6335
http://www.richmondgov.com/CommitteeUrbanDesign

Application Type

__ Addition/Alteration to Existing Structure
__ New Construction
___Streetscape
___Site Amenity
_X_ Encroachment
__ Master Plan
__ Sign
__ Other

Review Type

__ Conceptual
_X_ Final

Project Name: Festoon Lighting Demonstration

Project Address: 2043 West Broad Street, Richmond, VA 23220

Brief Project Description (this is not a replacement for the required detailed narrative): To provide for demonstration project to run festoon lighting over sidewalk to support poles in the right-of-way, subject to terms and conditions established by DPU, DPW, and PDR through approval of this project by UDC.

Applicant Information

(on all applications other than encroachments, a City agency representative must be the applicant)

Name: Mark A. Olinger Email: Mark.Olinger@Richmondgov.com
City Agency: Planning & Development Review Phone: 804-646-6305
Address: 900 East Broad Street, Room 511, Richmond, VA 23219
Main Contact (if different from Applicant): Same
Company: _____ Phone: _____
Email: _____

Submittal Deadlines

All applications and support materials must be filed no later than 21 days prior to the scheduled meeting of the Urban Design Committee (UDC). Please see the schedule on page 3 as actual deadlines are adjusted due to City holidays. **Late or incomplete submissions will be deferred to the next meeting.**

Filing

Applications can be mailed or delivered to the attention of "Urban Design Committee" at the address listed at the top of this page. **It is important that the applicant discuss the proposal with appropriate City agencies, Zoning Administration staff, and area civic associations and residents prior to filing the application with the UDC.**

UDC Background

The UDC is a ten member committee created by City Council in 1968 whose purpose is to advise the City Planning Commission on the design of projects on City property or right-of-way. The UDC provides advice of an aesthetic nature in connection with the performance of the duties of the Commission under Sections 17.05, 17.06 and 17.07 of the City Charter. The UDC also advises the Department of Public Works in regards to private encroachments in the public right-of-way.

TO: Urban Design Committee

FROM: Mark A. Olinger, Director
Department of Planning & Development Review

DATE: April 17, 2017

SUBJECT: Festoon Lighting Sidewalk Encroachment

Background:

- Over the past several years--but especially the last year or two--a number of businesses, and business associations, have approached the Dept. of Planning & Development Review regarding approvals to hang festoon lighting over the sidewalk.
- In several areas have some businesses have engaged in "guerilla lighting" activity to highlight their business and provide a certain level of amenity to their facility.
- The most recent example of a business owner wishing to do something (and the precipitating incident for a more detailed look at our processes) was the Savory Grain at 2043 W. Broad St. At the Savory Grain, the owner had installed the lights, attaching to the tree on one corner of the property, and a metal streetlight at the other corner. Savory Grain was ordered to take them down by DPU.
- There are other festoon installations around town...all without any formal approval.
- For a number of reasons, there is no formal procedure in place to do this although 1 group (Virginia St.) has gone before a reviewing body for approval to do a similar projects in concept, but in that instance are tying into an existing building.
- However, there is general agreement among DPU, DPW, and PDR that the installation of such lights can add character, charm, and life to areas where they've been installed.

Purpose of Request:

To provide demonstration encroachment for the purposes of exploring options for festoon lights across sidewalks elsewhere in the city.

Demonstration Encroachment Responsibilities:

DPU

- Acquire and set new poles, inside of the property line in which the festoon lighting cable and lights would be attached. Examples of the kind of poles DPU would use are attached.
    - Pole height: 12’
    - Pole diameter: 4”
    - Color: black, or open to other colors, perhaps gray
- DPU to own and maintain DPU facilities.

DPW

- Process Encroachments.

Building Owner/Tenant

- Apply for Encroachment.
- Pull permits.
- Power source, lighting, cable connecting lights, attachment strands (to DPU cable pole/pole) and break away-points.
    - Secure necessary electrical permits to install outlets to power lights
        - 120 volt GFCI, with weather cover for outdoors use, dedicated circuits or multiple based on amp load
    - Assure compliance with National Electrical Code (NEC)
        - NEC 225.6(B) Festoon Lights, NEC 225.18(1) 10’ clearance over walks
- Coordinate work with DPU installation of cables onto poles.
- Own, Install to attachment points, and maintain lights.
- Maintain the structural integrity of the vertical pole .
    - Maintain pole/cables
    - Replace break away – must coordinate with DPU on any work to de-energize light, remove lights, etc.
    - Building Owner/Tenant responsible for lights on cable in poor condition, failing or dangerous condition relating to vehicular accidents, ice, vandalism, etc.
    - Power compliance\protections
    - Removals

Significant internal discussion has occurred to move this demonstration project along to this point. The installation of this project will enable various City agencies, and the UDC, to understand how a larger-scale roll-out of similar projects elsewhere may work.

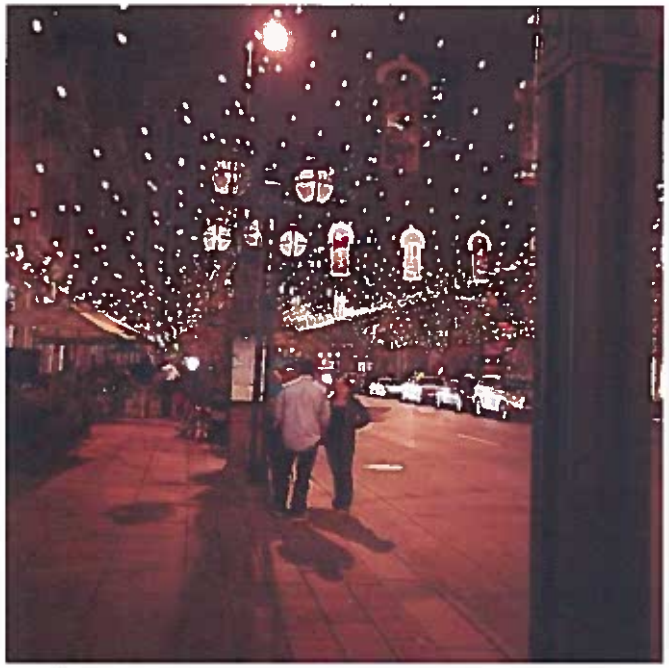
If you have any questions, please contact me directly.

Thank you for your consideration.

Festoon Lighting Encroachment: Prior Condition

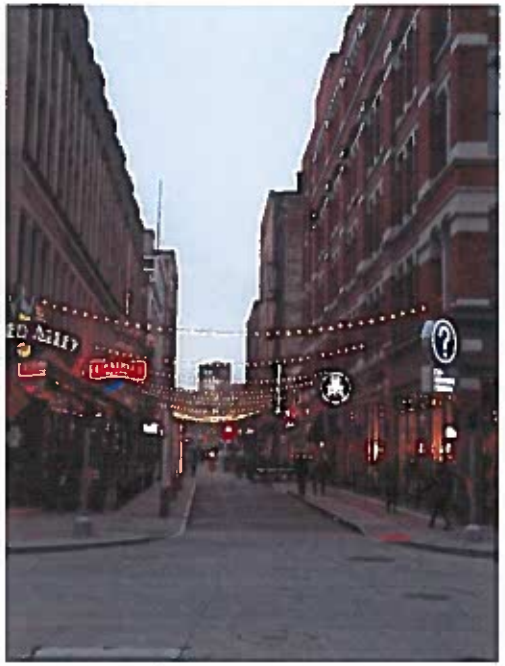
- Lights attached to DPU pole
- Lighting attached to tree
- Unclear whether or not 10' clearance above walk from existing enclosure to curb was maintained
- Lights ordered removed by DPU
- DPU, DPW, and PDR were interested in seeing if another way was possible to support the festoon lights over the walk without utilizing streetlight pole and tree

Precedent Images



Larimer Square, Denver, Colorado

Lower Manhattan



Cleveland, Ohio

Festoon Lighting Encroachment: Proposed

- Poles to be located inside of property line, extended. Poles to be placed in line with light pole and tree so as to minimize appearance of poles to passers-by
- Minimum 10' clearance above walk from existing enclosure to curb
- Savory Grain to provide LED "Warm White" lights and associated wiring to support lights from building face to poles
- Savory Grain to secure all necessary electrical permits needed to supply power to lights
- Savory Grain to apply for encroachment permit and to provide all insurance and other items needed by DPW

Festoon Lighting Encroachment: Proposed

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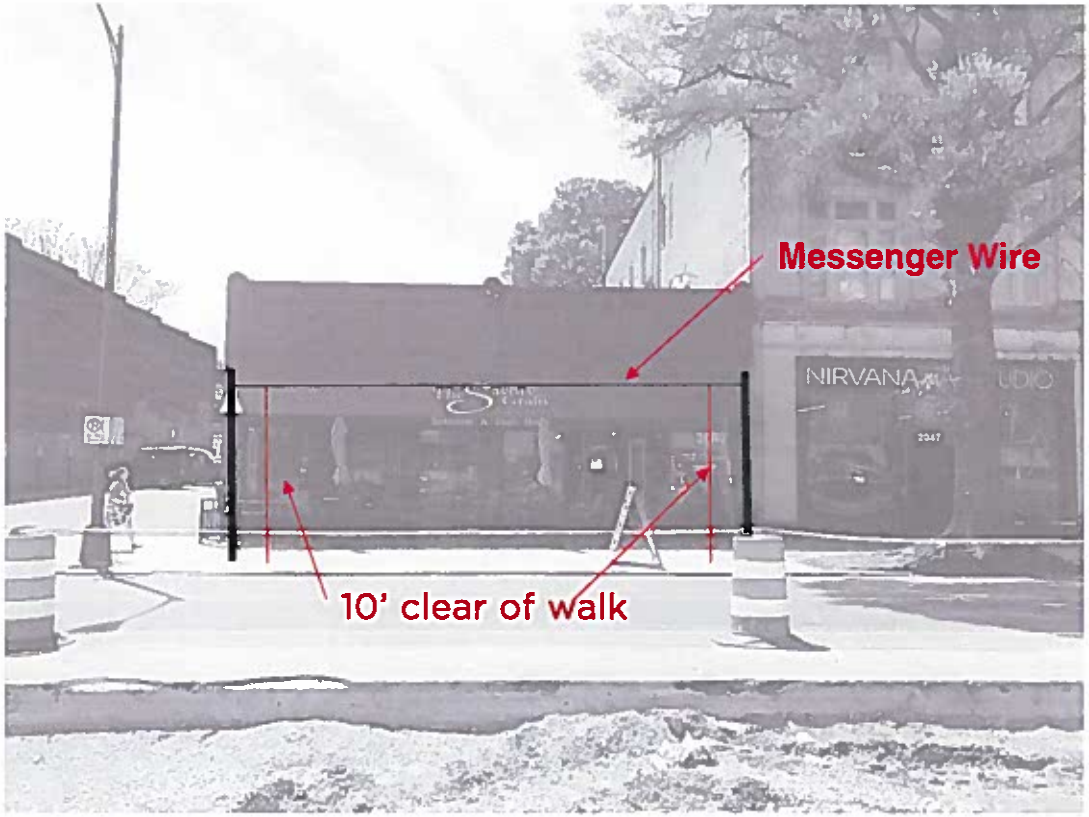
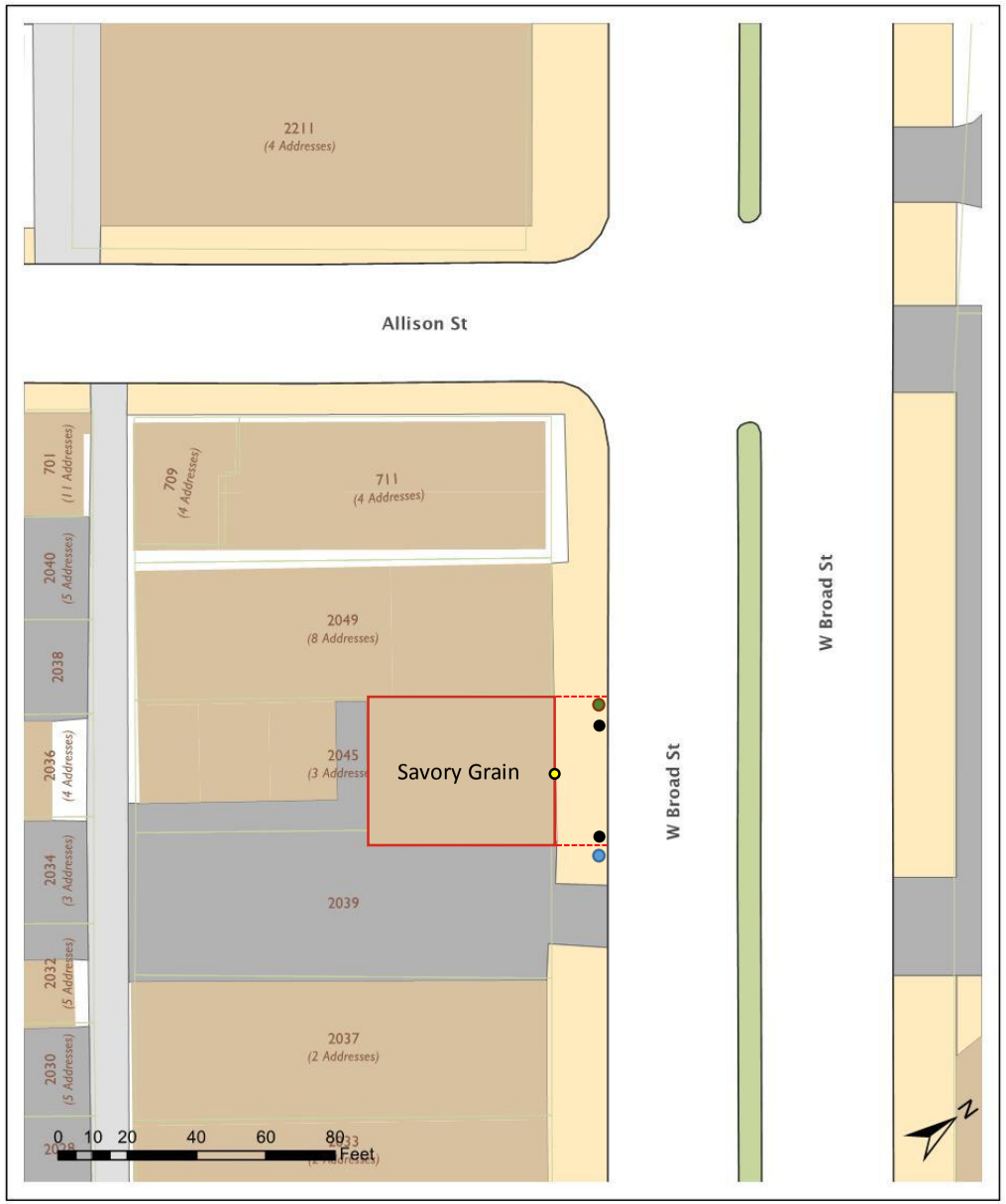


City of Richmond
Department of Planning
& Development Review

Savory Grain Site Plan



- Exist'g Streetlight
- Exist'g Tree
- Proposed Poles
- Electrical Connection
- Property Line
- Property Line, extended

DIRECT BURIAL POLE

POLE

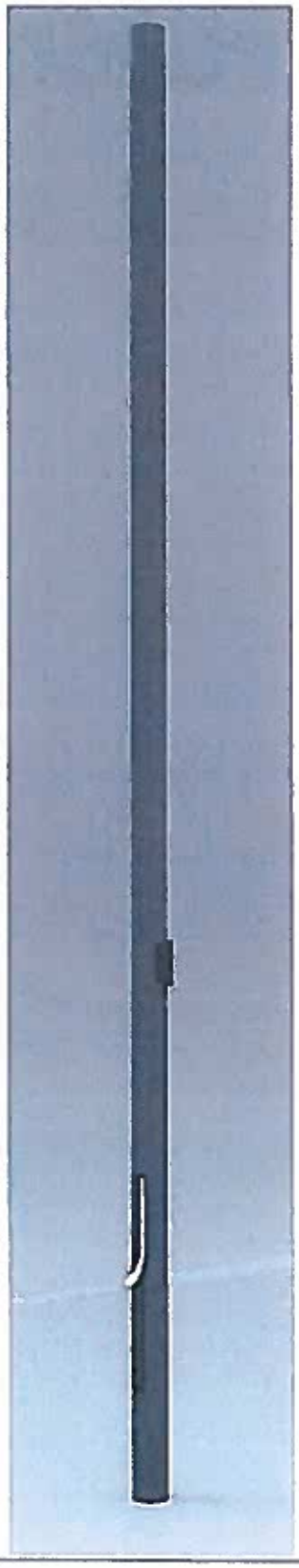
Shall be Straight Steel Grade B Extrusion with yield of 46,000 PSI and conforms to ASTM A500 Standards. Poles have ground bolts welded inside hand-hole, opposite side of the pole extrusion.

COATING

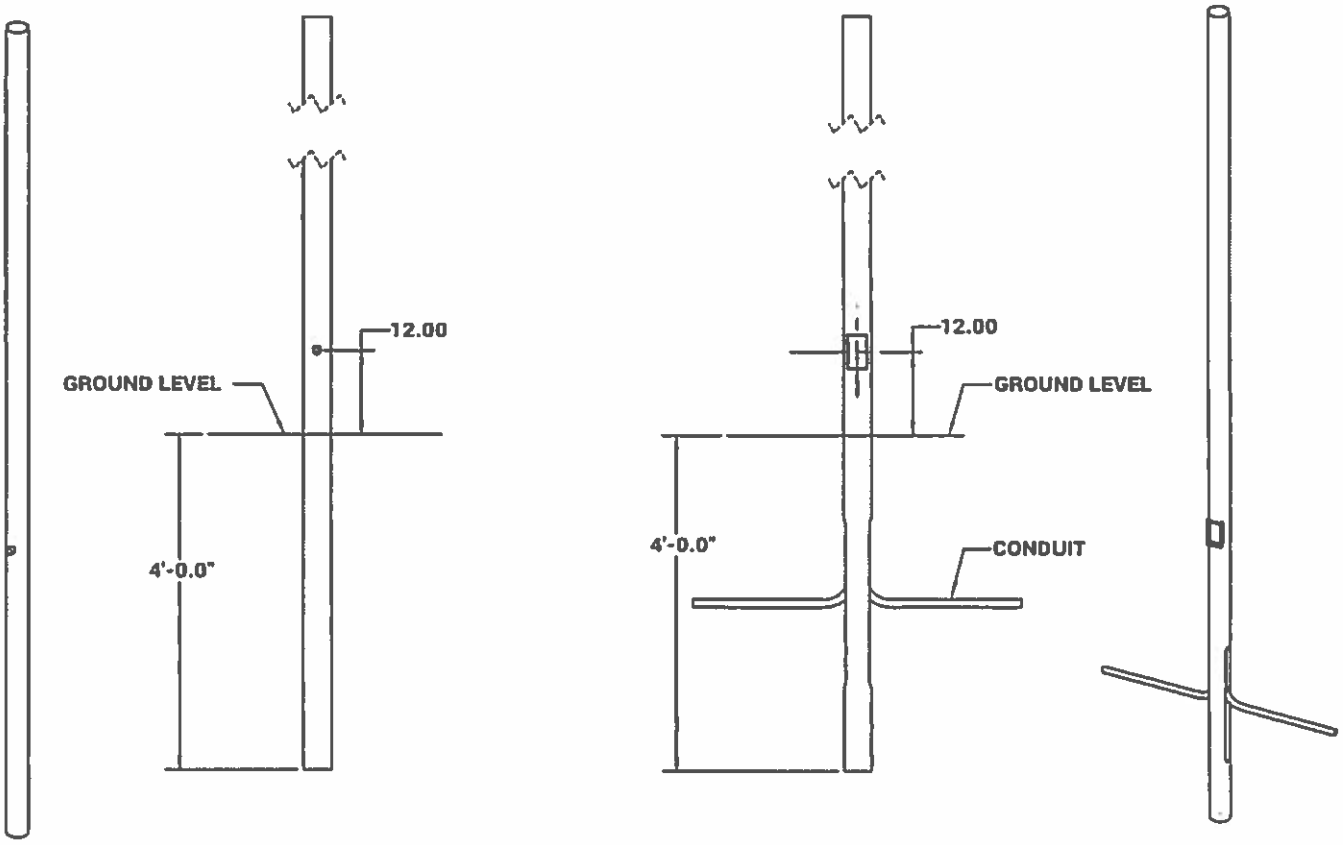
All poles have minimum 3mm powder coat finish. All poles are sandblasted prior to powder coat application.

BASE COVER, HAND HOLE COVER AND POLE CAP

All poles come with removable polymer pole cap installed. Pole caps are plastic snap-in caps in black finish. Base covers are made of Aluminum and powder coated to match the pole extrusion. The hand hole covers are provided with internal bridge support. For added strength, a reinforcement (HHR), constructed of 3" x 5" rectangular steel tubing, is welded to pole shaft. Hand hole, slots and 3/4" coupling are standard.



Project Name					Type	
Cat #	**Height**	**Pole Dim**	**Size**	**Orient**	**Color**	**Enhancements**
STEEL Direct Burial Round Straight Steel Pole **(DBRSSP)** Direct Burial Square Straight Steel Pole **(DBSSSP)** **ALUMINUM** Direct Burial Round Straight Alum Pole **(DBRSAP)** Direct Burial Square Straight Alum Pole **(DBSSAP)** Round Tapered Aluminum Pole **(DBRTAP)**	10 **(10)** 12 **(12)** 14 **(14)** 15 **(15)** 16 **(16)** 18 **(18)** 20 **(20)** 21 **(21)** 22 **(22)** 24 **(24)**	4" Round **(4R)** 5" Round **(5R)** 6" Round **(6R)** 4" Square **(4S)** 5" Square **(5S)** 6" Square **(6S)**	**STEEL** 120 in **(11G)** 180 in **(7G)** 250 in **(25)** **ALUMINUM** 120 in **(12S)** 188 in **(18S)** 250 in **(25S)**	Single **(SGL)** Double **(D-90)** **(D-180)** Triple **(T-90)** Quad **(QD)**	Bronze **(BRZ)** White **(WHT)** Silver **(SVR)** Green **(GRN)** Hunter Green **(HGN)** Black **(BLK)** Graphite **(GPH)** Grey **(GRY)** Custom **(CS)**	No Coupling **(NC)** No Slots **(NS)** No Hand Hole **(NH)** Hand Hole Reinforcement **(HHR)** Galvanized **(GLV)** **Tenon** 2 ⅛" Round **(T2R)** 3" Round **(T3R)** 3 ½" Round **(T312R)** 4 ½" Round **(T412R)** 3 ½" Square **(T312S)** 4 ½" Square **(T412S)** 5 ½" Square **(T512S)**


12.00
GROUND LEVEL
4'-0.0"
12.00
GROUND LEVEL
4'-0.0"
CONDUIT

ROUND STRAIGHT STEEL POLE

POLE EXTRUSION

Shall be Straight Steel Grade B Extrusion with yield of 46,000PSI. Conforms to ASTM A500 Standards. Poles have ground bolt welded inside hand hole opposite side of the pole extrusion. Pole Extrusion is conjoined to Anchor Base by welding internal to pole shaft and external to pole shaft. Hand Hole reinforcement is Constructed of 3"x 5" rectangular steel tubing, which is welded to pole shaft for added strength.

ANCHOR BASE

Manufactured from A36 Steel rated at 36,000 PSI, conforms the ASTM –A36 standards. Base Plate vary in size from 1" thick for poles 21 feet and over, 3/4" thick for poles 10 to 20 feet.

COATING

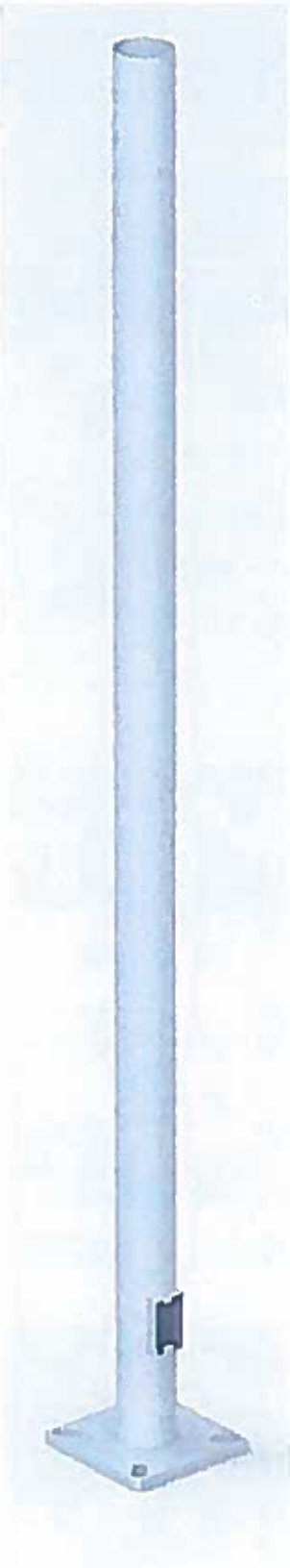
All poles have minimum 3mm powder coat finish. All poles are sandblasted prior to powder coat application

ANCHORAGE

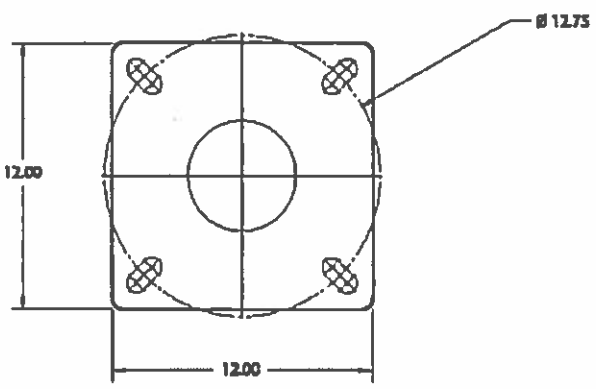
All anchor bolts are fully hot dipped galvanized and come with two galvanized nuts and washers per bolt.

BASE COVER, HAND HOLE COVER AND POLE CAP

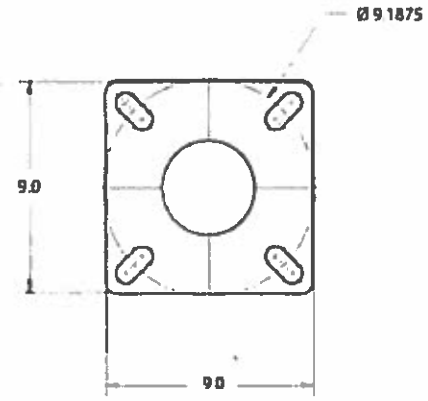
All poles come with removable polymer pole cap installed. All poles caps are black finish. All base covers are made of aluminum and powder coated to match the pole. The hand hole covers are provided with internal bridge support and also powder coated to match pole finish.



Project Name						Type		
Cat #	**Height**	**Pole Dim.**	**Size**	**Base Pattern**	**Orient**	**Color**	**Bolts**	**Enhancements**
Round Straight Steel Pole **(RSSP)**	10' **(10)** 12' **(12)** 14' **(14)** 15' **(15)** 16' **(16)** 18' **(18)** 20' **(20)** 21' **(21)** 22' **(22)** 23' **(23)** 24 **(24)** 25 **(25)** 26 **(26)** 27 **(27)** 28 **(28)** 30' **(30)**	4" Round **(4R)** 5" Round **(5R)** 6" Round **(6R)**	120 in **(11G)** 180 in **(7G)**	*(10'-20')* 8 3/16 - 10 3/16" Bolt Circle **(9BC)** *(21'-30')* 11½ - 14" Bolt Circle **(12BC)**	Single **(SGL)** Double **(D-90)** **(D-180)** Triple **(T-90)** Quad **(QD)**	Bronze **(BRZ)** White **(WHT)** Silver **(SVR)** Green **(GRN)** Hunter Green **(HGN)** Black **(BLK)** Graphite **(GPH)** Grey **(GRY)** Custom **(CS)**	3/4" x 30" **(3430)** 1" x 36" **(136)**	GFI Kit **(GFI)** GFI Provision Only **(PROV)** Round Base Cover **(RBC)** Galvanized **(GLV)** Anti Corrosion **(ACP)** **Tenon** 2 ½" Round **(T2R)** 3" Round **(T3R)** 3 ½" Round **(T312R)** 4 ½" Round **(T412R)** 3 ½" Square **(T312S)** 4 ½" Square **(T412S)** 5 ½" Square **(T512S)**



12" Base Bolt Circle



9" Base Bolt Circle

POLE EPA DATA								
Maximum EPA (ft) Allowable								
POLE HEIGHT	POLE DIA.	SIZE	BASE PLATE	BOLT CIRCLE BOLTS	BOLTS	80 Mph	90 Mph	100 Mph
10'	4" O.D.	.120	9" Sq. x 3/4"	9 3/16"	3/4" x 30"	17.2	13.2	11.2
12'	4" O.D	.120	9" Sq. x 3/4"	9 3/16"	3/4" x 30"	14.1	10.8	8.9
14'	4" O.D.	.120	9" Sq. x 3/4"	9 3/16"	3/4" x 30"	10.9	9.0	7.1
15'	4" O.D	.180	9" Sq. x 3/4"	9 3/16"	3/4" x 30"	9.5	8.2	6.2
16'	4" O.D.	.120	9" Sq. x 3/4"	9 3/16"	3/4" x 30"	9.2	6.8	5.3
17 1/2'	4" O.D	.120	9" Sq. x 3/4"	9 3/16"	3/4" x 30"	8.0	7.2	4.9
18'	4" O.D.	.120	9" Sq. x 3/4"	9 3/16"	3/4" x 30"	7.4	5.3	4.1
20'	4" O.D	.120	9" Sq. x 3/4"	9 3/16"	3/4" x 30"	6.1	4.2	3.1
20'	4" O.D	.180	9" Sq. x 3/4"	9 3/16"	3/4" x 30"	10.1	7.4	5.8
20'	5" O.D	.120	12" Sq. x 1"	9 3/16"	3/4" x 30"	9.5	6.7	5.5
20'	5" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	18.5	13.6	9.7
22'	4" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	4.7	3.1	1.9
22'	4" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	8.0	5.7	4.1
22'	5" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	8.3	5.8	4.0
22'	5" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	13.7	10.0	7.5
24'	4" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	4.1	2.8	1.6
24'	4" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	9.0	5.6	3.0
24'	5" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	7.1	4.4	3.9
24'	5" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	12.0	8.2	6.2
25'	4" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	3.3	1.8	-
25'	4" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	6.3	4.2	2.7
25'	5" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	6.4	4.0	3.5
25'	5" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	12.4	8.7	6.8
26'	4" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	2.8	1.3	-
26'	4" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	5.7	3.7	2.3
26'	5" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	5.8	3.4	2.8
26'	5" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	11.8	8.2	6.2
28'	4" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	4.1	1.9	1.1
28'	5" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	4.4	2.2	1.0
28'	5" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	8.5	5.7	3.7
28'	6" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	7.5	4.8	2.8
30'	5" O.D	.120	12" Sq. x 1"	12 3/4"	1"x 36"	3.4	1.8	-
30'	5" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	13.6	9.9	6.8
30'	6" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	7.2	4.6	2.8
30'	5" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	6.3	3.7	1.7
30'	6" O.D	.180	12" Sq. x 1"	12 3/4"	1"x 36"	12.0	8.1	5.4

CATENARY CABLE

Multi purpose cable with cable locks for quick, reliable support up to 330 pounds or load and spans up to 110 feet.

Performance

- Perfect for extra support when using commercial grade light string
- 500ft reels available for large scale projects (order cable locks separately)
- Catenary Cable kits come with 2 cable locks for use with loads up to 200lbs

Construction

- 1/8" Diameter outdoor rated galvanized cable and clips resist corrosion
- Kits include cable (60ft or 110ft length), (2) cable fasteners, and (1) cable release key

Installation

- Cable fasteners can be attached without the use of tools and adjusted quickly and easily
- For projects that require little to no cable sag, the tightening tool can be used with the standard kits for tightening up to 200 pounds and with the heavy-duty fasteners up to 330 lbs

Shown with optional LS-LOCK-10

Catenary Cable Kits & Bulk Reels

Catenary Cable Kits
LS-CABLE-60 60ft
LS-CABLE-110 110ft

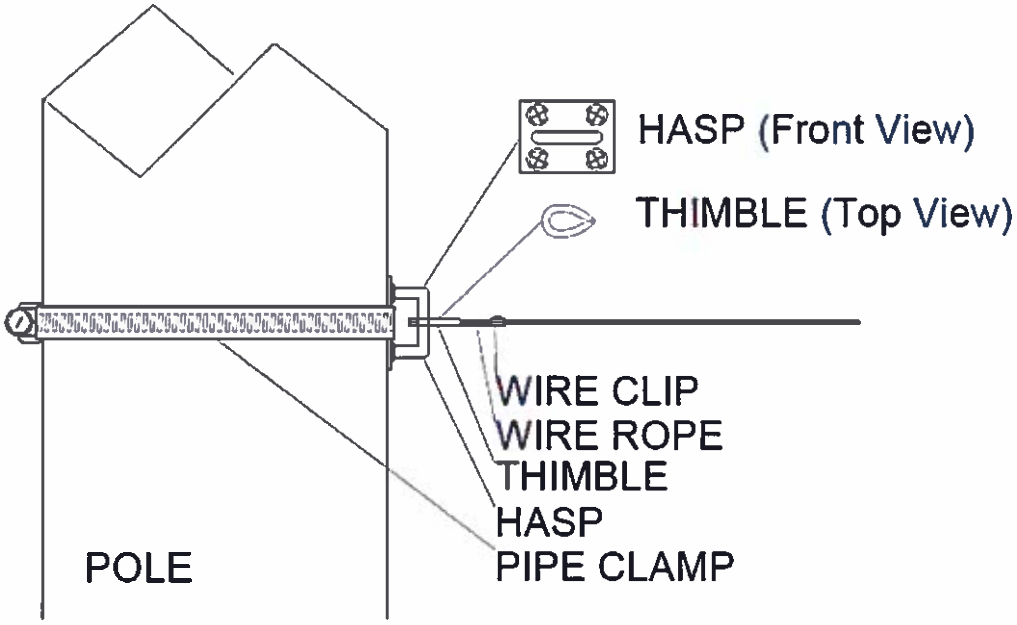
Catenary Cable Bulk Reel
LS-CABLE-500 500ft

Catenary Cable kits come with 2 cable locks for use with loads up to 200 lbs

Catenary Cable Accessories

LS-LOCK-4
Cable Lock for 1/8" cable
Heavy-duty lockable fasteners
support loads up to 330lbs
(4 per bag)

LS-TT
Tensioning Tool - option to eliminate sag from cable
Never tighten cable before load is attached
Never over-tighten cable


HASP (Front View)
THIMBLE (Top View)
WIRE CLIP
WIRE ROPE
THIMBLE
HASP
PIPE CLAMP
POLE

TECNI INSPIRED SOLUTIONS™

IMPORTANT SAFETY INFORMATION

Instructions for Safe Installation of M12 Eyebolts

Eyebolt Fixing Components

M12 eyebolt - 208.267.412

M12 Penny Washer - 163.036.012

M12 resin capsule - 182.110.012

Air Pump - 182.300.034

14mm drill bit - 182.150.014

Masonry Brush - 182.300.020

This data sheet outlines the safe installation procedure for fixing M12 stainless steel eyebolts into concrete or masonry with hammer-in resin capsules. When fitted correctly, the eyebolts will safely support 8mm 7x19 stainless steel cable spans. These systems are available as complete kits and can be ordered from our website.

The guide conforms to the "Code of Practice for the Installation, Operation and Removal of Seasonal Decorations", published by the County Surveyors' Society. All installations crossing a street or Public Highway must be carried out by a qualified installer operating under the direct instruction of the Highway Authority.

Anchorage Testing And Inspection

The Code of Practice requires M12 eyebolts to be tested to a minimum strength of 10kN. Testing should be carried out immediately following installation (taking account of setting times), and every five years thereafter. Record details of testing in the Anchorage and Catenary Wire Register.

For this purpose, Tecni-Cable stock an eyebolt testing kit (Cat Code 196.075.150) which will test up to 15kN. A Safe Use Data Sheet demonstrating the correct procedure for safe testing may be downloaded from the Tecni-Cable website.

Additionally, each anchorage should be visually inspected annually to ensure that the anchorage fixing method and material into which it is fixed are still sound and fit for purpose. Record inspection dates along with any signs of damage or corrosion in the Register.

Fitting Instructions

1. Drill hole to a depth of 120mm using a 14mm drill bit (Cat Code 182.150.014) with SDS drill (Fig 1).
2. Clean anchor hole thoroughly of debris and dust using brush (Cat Code 182.300.020) and blower (Cat Code 182.300.034) (Fig 2).
3. Inspect capsule for damage and resin quality. The resin should run easily inside the capsule at lukewarm temperature. If satisfactory, insert into drill hole (Fig 3).
4. Assemble washer (Cat Code 163.036.012) onto eyebolt and insert into hole until it contacts the top of the resin capsule. Drive in eyebolt with gentle even taps of the hammer until bolt is seated firmly against the washer (Fig 4).
5. Observe setting times (Fig 5) (see table below).
6. Test eyebolt strength using eyebolt testing kit (Cat Code 196.075.150) (Fig 6).

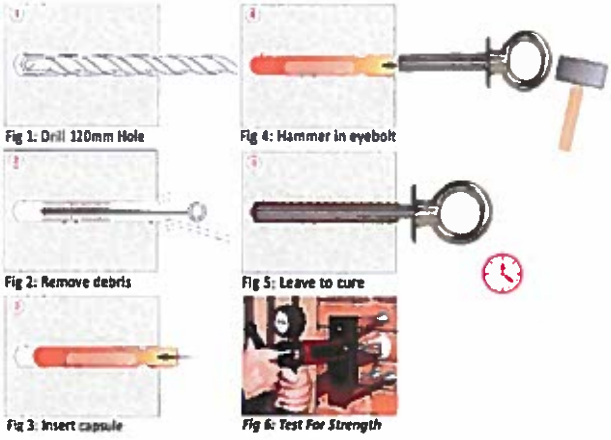


Fig 1: Drill 120mm Hole

Fig 4: Hammer in eyebolt

Fig 2: Remove debris

Fig 5: Leave to cure

Fig 3: Insert capsule

Fig 6: Test For Strength

Setting Times		
Base Material temp °C	Dry Concrete Mins	Wet Concrete Mins
>20	60	120
10-20	120	240
0-10	300	600
-5 - 0	600	

If in doubt, please contact us:
T: +44 (0) 845 519 0650
Email: sales@tecni-cable.com
Web: www.tecni-cable.com

The information in this leaflet should be passed to the user of the equipment

Instructions for the Safe Installation of a 4mm Catenary Span

This data sheet outlines the safe installation procedure and best practice for installing a 4mm galvanised cable catenary span.
See install video.

*** It is recommended you Wear Safety Glasses when fitting a catenary wire system. ***

Cable, Fittings and Tools required

- 4mm 7x7 Galvanised cable
- 2 x 4mm thimbles
- 1 x hook and eye galvanised turnbuckle
- 6 x galvanised wire rope clips
- Galvanised eye plate
- Ruler
- Marker eg Sharpie
- 8mm Spanner
- Adjustable spanner
- Pliers
- Wire rope cutters

Note: To work out the length of cable required. Measure the distance between your fixing points, subtract 260mm for the eye plates (20mm each) and length of the turnbuckle (220mm) and add on minimum of 250mm for turnback. Eg. If the space between walls is 10m or 10,000mm, deduct 40mm for the eye plates and 220mm for the turnbuckle = 9,940. Add 250mm for the turnback = 9,990mm which is the length of the cable required for your 10,000mm span.

Fixing the Eye Plate

1. Having decided where you are going to put the wall plate, drill 4 holes in line with the holes in the plate. Insert a rawl plug if going into brick or stone. Secure the eye plate to the wall with the staple horizontal using M6 or size 12 screws or bolts.

Installing and Tensioning the Catenary System

1. Open the Hook Eye turnbuckle approx ¾ of the way. To do this, hold both ends of the thread and turn the body clockwise and hook it on one of the eye plates. Leave and fit the other end first. Fig 1.

Fig 1.

Fig. 2

2. Fit the cable to the eye plate only end first. Leaving the cable coiled for ease of handling, mark off where the 3 x grips and 1 x thimble will go. Starting at the 'dead' end of cable, mark off 25mm to mark the position of the first grip, a further 25mm in for the second grip and a further mark 25mm up again for the third grip. This should mean there is at least 6 x cable diameter gaps left between grips. This is good practice. Mark at 120mm and this should be the top of the thimble once secure.

3. Put the thimble on the eye plate. To do this, open the thimble up using the pliers, put through the eye plate and close it back up. The easiest way to do this is to hold the thimble with the adjustable spanner in one hand and open and close using the pliers with the other.

4. Slacken off the 3 grips without undoing the nuts and push the cable through all 3 grips. Push the cable through the eye plate, bottom up, and then back through the grips to make a loop. Ensure the U-bolt is on the 'dead' side of the cable. Fig 3.

Fig 3.

Fig 4.

5. Starting at the 'dead' end, tighten the first clip on the first mark and then the second on the second mark. Put the cable around the thimble and finally tighten the third grip to secure the thimble. It is important that the thimble does not touch the grip. There should be a gap of between 15 and 20mm between the end of the thimble and the grip.

6. Keep working the nuts individually on all grips and retorque until they are all tight and pressing into the cable. The first end is now complete. Fig 4.

7. Unwind the cable and mark off the length required. To do this, mark the cable at the eye of the turnbuckle, add 120mm and cut the cable. Use cable cutters or an axel grinder to ensure a clean cut. This will be the required length.

8. Repeat the same process as for the other end, putting the thimble into the eye of the turnbuckle. Fig 5.

Fig 5.

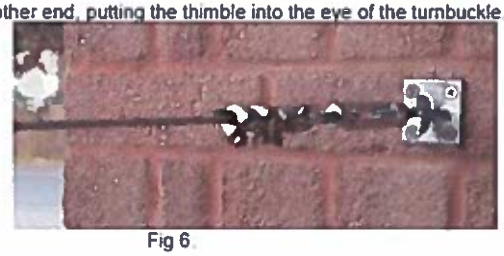


Fig 6.

9. To tension the cable, hold the end of the turnbuckle with the grips steady and turn the middle of the turnbuckle to tighten. Keep tightening until it comes under tension. Fig 6.

10. Your catenary wire is now ready to support your lighting, decorations etc.

Examples of light color. Preferred option "warm white (LED)"