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<th>CONSTRUCTION</th>
<th>DESCRIPTION</th>
<th>DWG No.</th>
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<tr>
<td>CB - - 1S</td>
<td>100kN Stayed Bollard - Material List</td>
<td>5-11-3-1</td>
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<td>100kN Stayed Bollard - Construction</td>
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<td>200kN Stayed Bollard - Material List</td>
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<td>200kN Stayed Bollard - Construction</td>
<td>5-11-5-2</td>
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**BOLLARD CONSTRUCTION:**

Small world object type: Pole

**BOLLARD POLES**

- TYPE: C (Concrete), S (Steel (future)), W (Wood (Future))
- LENGTH: 0m, 2m, 4m, 6m, 10m, 12m, 14m, 16m

**BOLLARD CAPACITY**

- 1: 100kN Bollard
- 2: 200kN Bollard

**POLE TYPE**

- B: Bollard

**STAYED**

- S: Stayed
- U: Unstayed

**SOIL TYPE**

- N: Normal soil
- B: Black soil

**C B 1 2 1 S N**
<table>
<thead>
<tr>
<th>ASSY</th>
<th>DESCRIPTION</th>
<th>CB101SN</th>
<th>CB121SN</th>
<th>CB141SN</th>
<th>CB161SN</th>
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<tbody>
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<td>Reverse back to back stay brackets</td>
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<td>1150-1</td>
<td>10m x stayed bollard concrete pole</td>
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<td>16m x stayed bollard concrete pole</td>
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**Twin Aerial Stay Arrangement**

Strength limit state tip capacity determined by number of ground stays.

---

**Notes**

1. Foundation design for cohesive soils with shear strengths of 100kPa or greater.

---

**Stayed Bollard**

Tip of C6S0L / C6RSDI30kN Pole

---

**Table**

<table>
<thead>
<tr>
<th>Overall bollard length (m)</th>
<th>'H1' Attachment height (m)</th>
<th>'R1' Tip rake (mm)</th>
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<tr>
<td>10</td>
<td>7.3</td>
<td>750</td>
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<td>12</td>
<td>9.3</td>
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**Construction Code**

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CB121SN
CB141SN
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<td>1151-2</td>
<td>12m x unstayed bollard concrete pole</td>
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<td>1151-3</td>
<td>14m x unstayed bollard concrete pole</td>
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</tr>
</tbody>
</table>

**MATERIAL**

**OVERHEAD SUB-TRANSMISSION**

**BOLLARD CONSTRUCTION**

**100kN UNSTAYED BOLLARD**

**MATERIAL**

Approved
P DE SOUSA ROQUE

Date
7/08/2013

Checked
R MARGANI

Drawn
K STOLZ

Ergon Energy Corporation Ltd
ABN 50 087 646 062

DRAWING NUMBER: 5-11-4-1

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<td>11</td>
<td>4-1</td>
<td>0C</td>
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</tbody>
</table>
Unstayed Bollard
Base of 80kN Pole

Refer Pole Stay
Construction Folder

Assy Selection
1079-6 to 8

Fill tip with concrete
to depth of 300mm
in lieu of pole cap

Assy Selection
1151-1 to 4

Over size hole required
if bored vertically

Twin Aerial Stay Arrangement

Refer Pole Stay
Construction Folder

<table>
<thead>
<tr>
<th>Overall bollard length 'L' (m)</th>
<th>'T' Tip Ø (mm)</th>
<th>'R2' Tip rake (mm)</th>
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Construction Code
CB101UN
CB121UN
CB141UN
CB161UN

'LBa' (m)

'G.L.'

1:8 cement stabilised backfill
and compacted in 200mm layers

10-7-3-3

Construction Folder

Refer Pole Stay
Construction Folder

Unstayed Bollard
Base of 80kN Pole

'LO' (m)

Length

'Bollard'

Overall

R2

1151-1 to 4

Assy Selection

'Pole Cap'

Fill tip with concrete
to depth of 300mm
in lieu of pole cap

Over size hole required
if bored vertically

1:8 cement stabilised backfill
and compacted in 200mm layers

Unstayed Bollard
Base of 80kN Pole

Refer 5-7-3-3

'LO' (m)

Length

'Bollard'

Overall

R2
## MATERIAL

<table>
<thead>
<tr>
<th>ASSY</th>
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<th>CB102SN</th>
<th>CB122SN</th>
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</tbody>
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### OVERHEAD SUB-TRANSMISSION

**BOLLARD CONSTRUCTION**

200kN STAYED BOLLARD

**MATERIAL**

- **MATERIAL**
  - 10m x stayed bollard concrete pole
  - 12m x stayed bollard concrete pole
  - 14m x stayed bollard concrete pole
  - 16m x stayed bollard concrete pole

---

**Ergon Energy Corporation Ltd**

ABN 50 087 646 062

Approved

P DE SOUSA ROQUE

Date

7/08/2013

Checked

R MARGANI

Drawn

K STOLZ

DRAWING NUMBER: 5-11-5-1

VOLUME  | FOLDER  | PAGE  | ISSUE  |
-------|---------|-------|--------|
5      | 11      | 5-1   | 0A     |
STAYED BOLLARD

Notes
1. Foundation design for cohesive soils with shear strengths of 100kPa or greater

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For biscuit

Over size hole required if bored vertically

1:8 cement stabilised backfill and compacted in 200mm layers

Twin Aerial Stay Arrangement

Strength limit state tip capacity determined by number of ground stays

STAYED BOLLARD

Tip of C6S0L / C6RSDI30kN Pole

Construction Code
CB102SN
CB122SN
CB142SN
CB162SN

OVERHEAD SUB-TRANSMISSION
BOLLARD CONSTRUCTION
200kN STAYED BOLLARD CONSTRUCTION

DRAWING NUMBER: 5-11-5-2

VOLUME  FOLDER  PAGE  ISSUE
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