

## High Voltage Switching Operations

### 1. INTRODUCTION

- 1.1. The following procedure has been developed to comply with the requirements of WHS Legislation to ensure the health, safety and welfare of workers.

### 2. OBJECTIVE

- 2.1. This document is to describe the procedures required to provide a safe working environment for persons accessing Shoalhaven City Council High Voltage Switchyards. The procedure is based on the Electrical Safety Code of Practise for safe access to High Voltage Apparatus.

### 3. DEFINITIONS

- 3.1. **SWMS:** Safe Work Method Statement
- 3.2. **Access Permit:** A document that forms part of a safe system of work, to provide electrically safe access to High Voltage Electrical Apparatus. It documents details of work to be carried out, isolation points, earthing locations and work group members who need to sign on before starting and off at completion.
- 3.3. **Authorised Person:** Is the person that provides signed Authorisation for a "High Voltage Operations Permit", who has been authorised by the General Manager, who is High Voltage Trained and has acquired through a combination of training, education and experience, sufficient knowledge and skill to enable him or her to perform the specific tasks required.
- 3.4. **High Voltage Lock:** A job specific lock belonging to the switching Co-ordinator/Operator used to lock off the isolation point.
- 3.5. **High Voltage Operations Permit:** Permit book for issue of authorised operations on high voltage apparatus. Permit is issued to the Switching Co-ordinator/Operator by the Authorised Person. The permit book has a copy of the High Voltage Switching Operations procedure and council's form for identifying/ranking and controlling risks involved in the task to be performed and risk associated with the site and is to be completed before commencement of work.
- 3.6. **High Voltage Switching Co-ordinator/Operator:** Person(s) nominated by authority of the Unit Manager – Mechanical / Electrical and has completed the High Voltage Operations Permit, authorised by the "Authorised Person" and is competent to perform the role of High Voltage Switching Co-ordinator/Operator and has acquired through a combination of training, education and experience, sufficient knowledge and skill to enable him or her to perform the specific tasks required.

Document Number:	Document Name: High Voltage Switching Operations	Responsible Group: Shoalhaven Water	TRIM Reference: PRD25/71
Adopted: 26/07/2022	Last Amended:	Review Date: 26/07/2025	Version: 1 Page 1 of 12

- 3.7. **High Voltage:** Greater than 1000vac or 1500vdc.
- 3.8. **Isolation/Switching:** Disconnection from all possible sources of electrical energy by opening of switches, withdrawing of circuit breakers, removal of fuses, links, connections and the like and rendering incapable of being energised unintentionally.
- 3.9. **Minimum Safe Working Distances** The Switching Co-ordinator/Operator shall clearly identify safe work areas and as required, tape, barricade areas unsafe for entry.
- 3.10. **Network Operator:** The Supply Authority representative who by delegation from the Supply Authority is responsible for the transmission and distribution system to Councils High Voltage site.
- 3.11. **Operator Earths:** Earths and short circuit devices of an approved type and size applied as an operation in a switching sheet.
- 3.12. **Personal Danger Tags/Locks:** Individual work group members, entered on the permit, shall place their danger tags/locks on the isolation point when working on equipment within the Access permit area.
- 3.13. **PPE:** Personal Protective Equipment
- 3.14. **Recipient:** A person who is nominated by the Authorised Person, to be a Recipient of an Access Permit or a Test Permit.
- 3.15. **Site Specific Risk Assessment:** The approved Council document used to record the identified hazards, assessing the level of risk, prioritising the order in which hazards will be controlled and determining appropriate control measures.
- 3.16. **Switch room:** An indoor enclosure specifically for a switchboard or switchgear.
- 3.17. **Switching Assistant:** A person who is nominated by the Authorised Person, to check high voltage switching operations for the issue of an Access Permit or Test Permit.
- 3.18. **Switching Instruction:** An approved document that has a unique identifying number which relates to the site and specific individual switch points, listing operations of switching in a step by step process.
- 3.19. **Switching:** The operation of switchgear, isolators, fuses or earthing devices.
- 3.20. **Switchyard:** An outdoor enclosure for switchgear and/or power transformers.
- 3.21. **Test Permit:** A documented form of authorisation that allows access to High Voltage electrical lines and apparatus for testing and removal of operator earths in accordance with stated conditions of isolation and earthing. A Test Permit can only be issued when no current Access Permit is in place. Testing staff must sign on before commencing work and sign off at completion.
- 3.22. **WHS:** Work Health and Safety TRAAD: Council's Training Records and Administration Database
- 3.23. **Work Area:** The work area under the control of an issued Access Permit or Test Permit.

Document Number:	Document Name: High Voltage Switching Operations	Responsible Group: Shoalhaven Water	TRIM Reference: PRD25/71
Adopted: 26/07/2022	Last Amended:	Review Date: 26/07/2025	Version: 1 Page 2 of 12

- 3.24. Work Group:** Persons signed on to an Access or Test Permit, to approach or work on High Voltage electrical lines and apparatus in accordance with stated conditions of the permit and isolation and earthing.
- 3.25. Working Earths:** Earths and short circuit applied by an individual of a Work Group at the Work Area under the control of a Recipient.

## 4. PROCEDURE

### TO BE COMPLETED BEFORE GOING TO SITE:

- 4.1.** Authorised Person to issue “High Voltage Operations Permit” to Switching Co-ordinator/Operator
- 4.2.** Ensure all equipment to be used has been tested and tagged for construction sites.
- 4.3.** Notify site controller of intended work, outage, and schedule appropriate time.
- 4.4.** Ensure that appropriate High Voltage test equipment is operational has been inspected within the last 6 months and has a current inspection tag. Necessary tools are available and well maintained.
- 4.5.** Obtain the specific Switching Instruction for the site and the identified isolation point required. (TRIM File XXXXX)

### TO BE COMPLETED ON SITE:

#### **4.6. Switching for High Voltage Isolation and Access**

- 4.6.1.** Switching Co-ordinator/Operator to complete Site Specific Risk Assessment with work group, as part of the “High Voltage Operations Permit” and review rescue plan applicable to works. Implement control measures.

#### **4.6.2. Switching Instruction for High Voltage Isolation and Access**

Follow exactly the Switching Instruction sheet for the site and the specific equipment or apparatus that requires isolation for the proposed works/testing.

Operation of any switching device for purposes of isolation and access within the scope of this procedure shall be performed by a High Voltage Co-ordinator/operator, authorised for this procedure.

The High Voltage switching Co-ordinator/operator shall be accompanied at all times by a switching assistant while switching operations are being carried out. The switching assistant shall verify every switching operation performed by the switching person.

Every switching step shall be in accordance with the high voltage switching instruction.

<b>Document Number:</b>	<b>Document Name:</b> High Voltage Switching Operations	<b>Responsible Group:</b> Shoalhaven Water	<b>TRIM Reference:</b> PRD25/71
<b>Adopted:</b> 26/07/2022	<b>Last Amended:</b>	<b>Review Date:</b> 26/07/2025	<b>Version:</b> 1 <b>Page</b> 3 of 12

The high voltage switching co-ordinator/operator shall not deviate from the switching instruction. Any errors perceived in the switching instruction, switching shall cease until clarification from the authorised Co-ordinator.

#### **4.6.3. Effective Isolation**

Effective isolation of electrical equipment for access purposes is achieved when it is disconnected from all possible sources of energy by means that prevent unintentional energisation of the electrical apparatus.

An effective point of isolation shall include an adequate break that prevents any inadvertent energisation.

Each point of isolation shall be locked with a high voltage lock and tagged with personal danger tag.

#### **4.6.4. Effective Earthing (operator earths)**

High voltage conductors shall be considered effectively earthed when electrically connected to the general mass of earth by approved earthing devices applied for the earthing and short circuiting of high voltage conductors.

#### **4.6.5. Issue of Access permit**

The issue of an access permit to a Recipient shall be within the limits of the access permit as prescribed by the switching instruction.

At least one set of operator earths shall be applied before an access permit is issued.

No point of isolation or earth placed under the conditions of issuing an access permit shall be removed while the access permit is in effect.

### **4.7 Issue of Access Permit**

#### **4.7.1. Access Permits**

An access permit is required in all cases when any person may be within the exclusion zone of a high voltage conductor or access any live parts of high voltage equipment for any reason.

An access permit shall be accompanied by a switching instruction.

#### **4.7.2. Issuing Access Permit to Recipient**

The high voltage switching co-ordinator/operator shall ensure that;

- The high voltage conductors detailed under the conditions of the access permit, as issued to the recipient, have been effectively isolated and earthed in accordance with the switching instruction.
- The Recipient is responsible to assemble and communicate to the work party conditions of the Access Permit including, work area, isolations points, access permit earths and precautions within the clearance area.
- The access permit work area, in particular the equipment that has been isolated, is appropriately demarcated within the limits of the access permit and the recipient has been instructed on the limits of the access permit.

<b>Document Number:</b>	<b>Document Name:</b> High Voltage Switching Operations	<b>Responsible Group:</b> Shoalhaven Water	<b>TRIM Reference:</b> PRD25/71
<b>Adopted:</b> 26/07/2022	<b>Last Amended:</b>	<b>Review Date:</b> 26/07/2025	<b>Version:</b> 1 <b>Page</b> 4 of 12

- Additionally he must ensure all members of the work group sign onto the Access permit before commencing work and sign off at completion. He must ensure each member of the work group have read and understood all conditions of the Access Permit.
- Only high voltage Co-ordinator/operator shall issue and cancel access permits.
- Only recipients shall accept and surrender access permits.

#### **4.7.3. High Voltage Switching Co-ordinator/Operator Lock**

Upon issue of the access permit, the high voltage switching operator shall place an isolation lock on the isolation switch arm together with a personal danger tag. The tag and lock can only be removed by the switching Co-ordinator/Operator named and only after removal of personal danger tags of persons listed on the Access/Test permits by each person and the cancellation of the access or test permit.

#### **4.7.4. Final Test for Dead**

The Recipient shall ensure that a final test for dead is performed by the switching Co-ordinator/Operator prior to any work being done under the Access permit.

#### **4.7.5. Work under an Access Permit.**

Any person who is to work under the permit shall sign onto the Access Permit and place their personal tag/lock on the isolation lock under the direction of the Recipient.

- The Recipient shall be responsible for ensuring that the work group members sign off and remove their personal tags from the isolation point on completion of the works.
- Any work group member who signs off the access permit shall not re-enter the work area.
- A work group member may only leave the work area for a short time and only with the approval of the Recipient and only if conditions do not change, and surrender of the permit is not taking place.

#### **4.7.6. Working Earths**

The Recipient shall, if assessed as being required as determined by works, ensure that working earths are placed as soon as possible to protect against any potential electrical hazard that may occur.

<b>Document Number:</b>	<b>Document Name:</b> High Voltage Switching Operations	<b>Responsible Group:</b> Shoalhaven Water	<b>TRIM Reference:</b> PRD25/71
<b>Adopted:</b> 26/07/2022	<b>Last Amended:</b>	<b>Review Date:</b> 26/07/2025	<b>Version:</b> 1 <b>Page</b> 5 of 12

#### **4.7.7. Transfer of Access Permit Recipient**

When control of the Access Permit is to be handed over to another Recipient (transferred), the incoming Recipient shall ensure that he is familiarised with the conditions and boundaries of the Access Permit.

The incoming Recipient shall:

- Become familiar with the conditions of the Access permit.
- Confirm the details of the Access Permit and the safety precautions, other precautions and any nearby exposed HV or LV electrical apparatus.
- Advise the Work Group regarding the change of Recipient.
- Record the transfer of the Access Permit in the relevant section of the Access Permit.

#### **4.7.8. Cancellation of the Access Permit**

The High Voltage Switching Co-Ordinator/Operator shall only cancel an Access Permit after the Recipient has verified all works are complete. When an Access permit has been cancelled the same Access Permit shall not be re-issued.

The recipient shall be responsible for ensuring that:

- All work has been completed.
- All persons in the Work Group sign off the Access Permit and remove personal danger tags/locks.
- The Recipient has visually inspected the work site to check that no unsafe condition exists.
- The Recipient signs off the Access Permit.

An Access Permit must be cancelled before a Test Permit can be issued.

### **4.8. High Voltage Test Permits**

A Test Permit is required where a working group needs access to high voltage apparatus and operator earths may need to be removed or lethal currents may be produced, during testing of the high voltage apparatus.

#### **4.8.1. Issuing a Test Permit**

The High Voltage Switching Co-Ordinator/Operator shall ensure that the Recipient has cancelled the Access permit before issuing a Test permit to the Recipient.

#### **4.8.2 Removal of operator earths for testing**

Removal and replacement of operator earths for testing shall only be done under the direction of the Test Permit Recipient, by the High Voltage Switching Co-Ordinator/Operator. The switching assistant shall confirm all removal and reinstatement of earths and that they are accounted for on the schedule of operator earths section of the Test Permit.

<b>Document Number:</b>	<b>Document Name:</b> High Voltage Switching Operations	<b>Responsible Group:</b> Shoalhaven Water	<b>TRIM Reference:</b> PRD25/71
<b>Adopted:</b> 26/07/2022	<b>Last Amended:</b>	<b>Review Date:</b> 26/07/2025	<b>Version:</b> 1 <b>Page</b> 6 of 12



#### 4.8.3. Test Permit Work Group

The Test Permit Recipient shall be responsible for the following;

- Any person working under a Test Permit shall sign onto the Test Permit Group signature section and remain under the supervision and direction of the Recipient.
- The Recipient shall remain in constant supervision of all work performed under the permit.
- Any Work Group member who leaves the area must sign off the Test Permit.
- Any Work Group Member who has signed off the Test permit shall not re-enter the area or equipment under the control of the Test Permit.

#### 4.8.4. Cancellation of the Test Permit

The Test Permit should be cancelled by the Recipient as soon as the testing is finished.

Prior to cancelling a Test Permit, the Recipient shall ensure that;

- All operator earths have been reinstated by the High Voltage Co-Ordinator/Operator.
- All working earths placed under the Test Permit have been removed.

#### 4.9.0 Re-Instatement of site

Before any conductors and apparatus are energised after completion of the work under an Access Permit the High Voltage Co-Ordinator/Operator shall ensure;

- All work is complete
- All plant and equipment has been removed
- All persons are clear of electrical apparatus and high voltage switchyard.
- All relevant Access Permits have been cancelled
- Relevant switching sheet has been completed and verified by switching assistant
- Notify site controller that the site can be re-energised
- If applicable, notify Network Operator

Document Number:	Document Name: High Voltage Switching Operations	Responsible Group: Shoalhaven Water	TRIM Reference: PRD25/71
Adopted: 26/07/2022	Last Amended:	Review Date: 26/07/2025	Version: 1 Page 7 of 12

## 5. PLANT AND EQUIPMENT REQUIRED

Specific high voltage equipment must be inspected 6 monthly and tagged to identify currency of inspection.

- 5.1. Barricades
- 5.2. Energy Isolation Device/s
- 5.3. Ensure appropriate hand tools are available for task and in serviceable condition.
- 5.4. Ensure appropriate rescue equipment as outlined in Site Specific Checklist is available and in serviceable condition.
- 5.5. Ensure fully stocked first aid equipment is available.
- 5.6. Insulating mats
- 5.7. Pad lock for each affected person
- 5.8. Personal Protective Equipment
- 5.9. Switching Sheet applicable for site
- 5.10. Tags for each affected person
- 5.11. Test Meter/s

## 6. QUALIFICATIONS AND TRAINING

All work group members on site shall have completed the following training:

- 6.1. WorkCover General Construction Induction
- 6.2. Work Activity WHS and Introduction to Site Specific Work Health and Safety
- 6.3. Manual Handling/Back care
- 6.4. Trained in the application of the Safe Work Method Statement
- 6.5. Specific training and qualifications as required for particular task
- 6.6. Additional qualifications and training requirements may be identified when completing the 'Site Specific Risk Assessment, Pre-Excavation Risk Assessment and Traffic Control Risk Assessment'. For example:
  - Working at Heights
  - Ladders Use and Maintenance
- 6.7. Training details are located in Training system for internal employees and record management system for contractors.

Specific Training Requirements for High Voltage

- 6.8. Authorised Person and the Switching Co-Ordinator/Operator must be High Voltage Trained and acquired through a combination of training, education and experience, sufficient knowledge and skill to enable him or her to perform the specific tasks required.
- 6.9. Authorised by the Unit Manager – Mechanical / Electrical in writing after verification of above and issued with a signed permit card.

Document Number:	Document Name: High Voltage Switching Operations	Responsible Group: Shoalhaven Water	TRIM Reference: PRD25/71
Adopted: 26/07/2022	Last Amended:	Review Date: 26/07/2025	Version: 1 Page 8 of 12



## **7. RELEVANT PROCEDURES, REGULATIONS, AND LEGISLATION**

- 7.1.** Work Health and Safety Act 2011
- 7.2.** Work Health and Safety Regulation 2011
- 7.3.** Shoalhaven City Council Corporate WHS Policies and Procedures
  - Risk Management Procedure
  - Electrical Safety Procedures for Cranes and Plant
  - Working at Heights
  - Ladders Use and Maintenance
  - “High Voltage Operations Permit”
  - High Voltage Access Permit or Test Access Permit
  - Electrical Items Safety Procedure
  - Manual task Guidelines

## **8. ROLES AND RESPONSIBILITIES**

- 8.1.** Managers are to ensure there is a safe system of work.
- 8.2.** Supervisors are to ensure that affected person(s) are instructed in this Safe Work Method Statement, and any other relevant SWMS identified for work areas or activities.
- 8.3.** It is the responsibility of the person controlling the job to ensure that all safety and operational guidelines and SWMS are followed and the relevant forms and permits are completed before any work commences at the worksite.
- 8.4.** On site personnel shall:
  - Complete “High Voltage Operations Permit”
  - Ensure all equipment and PPE are in good order
  - Ensure all control measures are undertaken
  - Ensure emergency procedures are understood and in place
  - Ensure that waste is disposed of properly
  - Ensure Access Permit paperwork is correct and signed by work group.
  - Ensure all unprotected persons are kept clear of area
  - Administer first aid as required.

<b>Document Number:</b>	<b>Document Name:</b> High Voltage Switching Operations	<b>Responsible Group:</b> Shoalhaven Water	<b>TRIM Reference:</b> PRD25/71
<b>Adopted:</b> 26/07/2022	<b>Last Amended:</b>	<b>Review Date:</b> 26/07/2025	<b>Version:</b> 1 <b>Page</b> 9 of 12

## 9. HAZARD ASSESSMENT

9.1. Prior to the implementation of this SWMS the following hazards shall be assessed for level of risk and the associated control measures adhered to during all related activities. The results of this assessment shall be documented on the Site Specific Risk Assessment.

POTENTIAL HAZARDS	POTENTIAL RISK	RISK RANK	CONTROL MEASURES
Inappropriate Manual Handling	Muscle sprain (limbs or torso)	M	- Undertake training in proper manual handling techniques - Task rotation, muscle stretching exercises, use correct equipment Manual Task Guidelines
Equipment Malfunction or misuse	Muscle sprain (limbs or torso) Cuts and abrasions Entrapment	M	- Undertake pre-use checks, all operations and maintenance in accordance with manufacturer's recommendations and other safety procedures Procedure: Electrical Items Safety
Slips, trips and falls	Muscle sprain (limbs or torso) Cuts and abrasions Entrapment	M	- Apply appropriate controls as outlined in Site Specific Checklist.
Weather and moisture	Short circuiting of equipment	L	- Apply appropriate controls as outline in Site Specific Checklist
Issues related to Access	Entrapment due to short circuit causing fire or explosion	L	- Ensure adequate access and egress through the Risk Assessment process (Site Specific Checklist)
Hazardous Area installation	Fall from height and asphyxiation	M	- Apply the appropriate Policy/Procedure, for example, Confined Space Entry or Working at Heights (Contained in Corporate WHS Manual) Procedure: Confined Space Working at Heights Procedure, Hazardous Chemicals and Dangerous Goods Procedure, Electrical Safety Procedure for Cranes and Plant,
Cable damage/deterioration	Death Permanent disability Minor injury	H	- To be addressed and controlled as part of the Site Specific Checklist Energy Isolation Procedure, Electrical Safety Procedure for Cranes and Plant,

POTENTIAL HAZARDS	POTENTIAL RISK	RISK RANK	CONTROL MEASURES
Power tools	Electrocution death Permanent disability Minor injury	H	- All power tools to be tested and tagged as per Electrical Safety Procedures for Cranes and Plant (contained in Corporate WHS Manual) Procedure: Electrical Safety Procedures for Cranes and Plant, Electrical Items Safety Procedure, Inspection
Working at heights	Death Permanent disability Minor injury	H	- Reference should be made to the Working at Heights Procedure, (Contained in Corporate WHS Manual) Procedure: Working at Heights, Ladders Use and Maintenance,
Asbestos	Asbestos	M	- Use appropriate PPE: Coveralls, insulated gloves, approved respirator - Barricade area, 5 meters - Use designated asbestos removal equipment only (Asbestos Removal Box) - Clean non-disposable respirator (if used) with damp rag. - Place all contaminated rags, disposable PPE, and vacuum waste bag into asbestos waste bags (200-micron polythene bags) and seal with duct tape - Ensure waste bags are suitably marked - Strict personal hygiene - Store waste temporarily in an allocated secure area within the Electrical Workshop until disposed of in accordance with the requirements of EPA – NSW. Procedure, Asbestos Management Procedure, Dust Control Procedure, Working at Potentially Contaminated Sites

POTENTIAL HAZARDS	POTENTIAL RISK	RISK RANK	CONTROL MEASURES
Needles/sharp objects	Hepatitis HIV Aids Cuts	M	<ul style="list-style-type: none"> <li>- Training in syringe (sharps) disposal</li> <li>- Do not place hands where you can't see contact area</li> <li>- Wear puncture resistant gloves</li> <li>- Use tongs, if practical</li> <li>- Keep guards, protective sheaths etc in place</li> </ul> Procedure: Safe Handling Procedure – Hypodermic Needle & Syringe, Hepatitis Immunisation Procedure
Confined space - Asphyxiation	Death Loss of consciousness	H	<ul style="list-style-type: none"> <li>- Complete confined space entry permit</li> <li>- Reference should be made to the Confined Space Work Procedure, located in Section 2 of the Corporate WHS Manual</li> <li>- Use gas testing equipment</li> <li>- No equipment capable of generating noxious gas in the work area</li> <li>- Ventilate confined space</li> <li>- Wear safety harness and fall arrestor</li> </ul> Procedure: Confined Space Procedure, Working at Heights, Working at Potentially Contaminated Sites
Access by unauthorised and untrained people	Death Permanent disability Minor injury	H	<ul style="list-style-type: none"> <li>- Construct appropriate barricades and/or tape off area</li> </ul>
Exposure to high voltage electricity	Death Permanent disability Minor injury	H	<ul style="list-style-type: none"> <li>- Barricades</li> <li>- Insulating mats</li> <li>- Ensure clothing and personal items are fitted correctly and are not able to come in contact with moving or live parts.</li> <li>- Lock out and tag out Procedure</li> <li>- Energy Isolation Procedure,</li> <li>- Electrical Safety Procedure</li> <li>- High Voltage Operations Permit procedure</li> <li>- Switching Instructions.</li> </ul>