

# Boaters' guide to electricity cable crossings

of NSW navigable waters

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## 1. INTRODUCTION

### 1.1 Preamble

NSW Maritime, as delegate of the Minister for Ports and Waterways, is responsible for the safe navigation of both recreational and commercial vessels in NSW (S.24, *Ports and Maritime Administration Act 1995*). Electricity cables and wires which cross navigable waters can pose a hazard to navigation. The most significant potential hazards are posed by live, overhead, electricity crossings. Masts, crane jibs, aerials and the like may contact the overhead electricity cables and anchors may become entangled with submarine cables. Such events may damage to the vessel, serious injury to its occupants and even death. Other consequences include damage to the electricity infrastructure and loss of supply, environmental impacts and legal and financial liabilities.

Given that people have been seriously injured and killed in incidents in which a vessel has come into contact with live electricity wires, and that vessel damage has occurred in these and other incidents, a new system has been developed to promote crossing safety.

The new system was developed collaboratively by representatives of EnergyAustralia, Integral Energy, Country Energy, TransGrid, Industry and Investment NSW and NSW Maritime. It is to be reflected in the crossing controllers' Network Management Plans and Public Electrical Safety Awareness Plans.

### 1.2 Definitions

The following is a list of specific terms, and their meanings, for the purposes of this document:

*Crossing* – This is any electrical infrastructure which crosses a navigable waterway.

*Crossing controller* – This is any person, organisation or entity owning, controlling or operating a crossing. It also includes any person, organisation or entity planning to install a crossing.

*Design height* – This is the minimum height of an overhead crossing above the Australian Height Datum (AHD) with the conductor at maximum sag under all conditions.

*Highest Astronomical Tide (HAT)* - This is the highest tide level predicted, based on any combination of astronomical conditions.

*Maximum vessel height* – This is the maximum vessel height, above the waterline, which can be reasonably expected to navigate on the waterway in the vicinity of the crossing.

*Modification of a crossing* – This is a substantial change to crossing infrastructure. For instance, if an existing overhead crossing is being moved due to a series of boating accidents in which the crossing has

been struck, this is considered to be a modification. The repair of a single cable is not considered to be a modification whereas the replacement of all, or the majority of, the cables is a modification.

*Navigable waters* – These are the waterways which have been mapped by NSW Maritime for the purposes of the crossings system and these maps are available to crossing controllers through protocols developed in relation to exchange of Geographic Information System data.

*Reported incident* – An incident involving any vessel and a crossing and which has been reported to either NSW Maritime, the NSW Police Force, Industry and Investment NSW or a crossing controller.

*Safe approach distance* – The distance from an electricity conductor which shall be maintained by an ordinary person or any object held by, or in contact with, that person. The appropriate distance is determined in accordance with current National Electricity Network Safety Guidelines.

*Serious injury* – Any injury which requires admission to hospital.

*Submarine crossing* – Submarine crossings include cables, wires and the like which have been laid on the seabed (either trenched or untrenched) or under the seabed (using trenchless technology).

### 1.3 The aims and purpose of the new system

The system primarily aims to promote navigation safety outcomes. The protection of property and the electricity supply are further aims.

The primary purpose of the system is, therefore, to guide crossing controllers in promoting navigation safety outcomes when they are planning, installing, maintaining and modifying crossings.

This document is accompanied by appendices which provide sign templates.

### 1.4 Approvals

It is the crossing controller's responsibility to obtain all approvals which may be required from various agencies.

Sydney Harbour and its tributaries, Botany Bay, Newcastle Harbour and Port Kembla Harbour, are vested in NSW Maritime. Where a crossing is proposed for these waterways NSW Maritime will firstly establish whether, as landowner, it consents to the use of its land for the purpose. If such consent is given for the proposal, the crossing controller may also be required to obtain an easement from NSW Maritime.

For other waterways throughout the state, the Land and Property Management Authority is the landowner and it may have requirements in relation to crossings.

Where excavation or filling activities are planned it may also be necessary to obtain permission under

Section 13TA of the *Maritime Service Act 1935*, before work can begin. Crossing controllers must make their own enquiries as to whether these permits are required (see paragraph 7.6).

Local councils and other consent authorities may require a development application and crossing controllers must make their own enquiries concerning the requirements of the consent authorities.

## 2. RISK MANAGEMENT

The system requires a risk management approach to the planning, installation, maintenance and modification of crossings.

The aim of the risk assessment is to ensure that foreseeable risks associated with the crossing, particularly those to navigation safety, are as low as reasonably practicable and that appropriate steps are taken to prevent fatalities and injuries to persons and/or damage to property and interruption to supply of electricity.

Crossing controllers are to ensure that all crossing risk assessments are conducted in accordance with the crossing controllers' standard work method statements and corporate risk management processes which are to be of a standard equal to, or better than, AS/NZS 4360:2004 – Risk Management. All risk assessments are to be performed by a competent person(s) familiar with AS/NZS 4360:2004.

Where a crossing is unavoidable, a submarine crossing is generally NSW Maritime's preferred option as it presents a significantly lower risk to navigation safety.

All proposed new overhead crossings for which the abovementioned risk assessment processes indicate would, following consideration of appropriate treatments, still pose an "intolerable" risk are to be redesigned as submarine crossings or a similar solution reached. Those which are assessed as posing a "tolerable" or "negligible" risk may be developed as overhead crossings.

In the case of crossings which are in existence at the time of implementation of the system, a risk assessment is required to be undertaken by the crossing controller in accordance with the timetable at paragraph 5.2. If the assessed risk of an existing overhead crossing is "intolerable", or not as low as reasonably practicable, it is to be treated to reduce the assessed risk to an acceptable level in accordance with the timetable at paragraph 5.2.

Appropriate treatments, which may be used singly or in combination, may include the following:

- the elimination of the need for a crossing (eg by re-routing the cables around the perimeter of the bay);
- relocating the crossing on the waterway;
- reconfiguring the network;
- installing a submarine crossing;
- raising the proposed crossing height;
- the use of signage;
- use of coloured balls and/or coverings (eg "tiger tails");
- the use of "breakaway" cables;

- cable insulation;
- lighting the signage associated with the crossing; and
- other treatments as appropriate.

In the event that a reported incident occurs, an analysis will be conducted to determine an explanation. The analysis will be conducted in accordance with the provisions at paragraph 6.3.

The following pages provide a detailed description of the requirements for submarine and overhead crossings and their associated signage.

### **3. SUBMARINE CROSSINGS**

#### **3.1 Aim of these provisions**

The aim of these requirements is to ensure that all submarine cables and similar equipment are installed and signposted to promote the aims of the system.

#### **3.2 Requirements for submarine crossings using trenchless technology**

When planning a new submarine crossing, or when planning modifications to an existing crossing, controllers are to undertake appropriate research in accordance with the provisions of paragraphs 7.1 to 7.6. In particular the crossing controller is to seek NSW Maritime's input in relation to its navigation safety requirements.

##### **3.2.1 Construction**

Drilling activities are to be undertaken at sufficient depth to ensure that they do not compromise future dredging plans required, for instance, for port expansion. Crossing controllers are to be guided in this regard by the Port Corporations and NSW Maritime.

##### **3.2.2 Signage**

Where the crossing entry/exit points are not within the bed of the waterway and navigation safety is not affected in any way, a small sign only is sufficient to advise future land managers of the location and profile of the crossing.

Where the entry/exit points may affect navigation safety, signage is to be provided in accordance with the general submarine crossing requirements below.

#### **3.3 Requirements for other submarine crossings**

When planning a new crossing, or when planning modifications to an existing submarine crossing, controllers are to undertake appropriate research in accordance with the provisions of paragraphs 7.1 to 7.6. In particular the crossing controller is to seek NSW Maritime's input in relation to its navigation safety requirements.

### 3.3.1 Construction

All submarine crossings which are not constructed using trenchless technology and where the entry/exit points may affect navigation safety, are subject to the following requirements:

- Crossings of NSW Maritime's land are to be laid at sufficient depth to ensure that they do not compromise future dredging plans required, for instance, for port expansion. Crossing controllers are to be guided in this regard by the Port Corporations and NSW Maritime.
- Depending on the results of the risk assessment crossings may need to be protected by Reno Mattress technology; metallic sheathed; armour wired; buried to a depth of 1m clear below the bed of the waterway; or, if laid in rock, 0.3m clear and backfilled with large broken rock.

### 3.3.2 Signage

- Sign templates have been prepared generally in accordance with Australian Standard AS 2416-2002 Design and Application of Water Safety Signs. It is recognised that Australian Standard AS 2416-2002 Design and Application of Water Safety Signs is intended primarily for signs at beaches, swimming pools and the like, however a more suitable standard is unavailable. Hence the sign templates have been developed following field analysis and have been adapted to ensure that sign sizes are practicable for the purpose.
- A sign is to be located on both sides of the waterway as close as possible to the crossing entry and exit points on the bed of the waterway. A parallel orientation to the waterway will generally be appropriate.
- There are two sign sizes applicable to submarine crossings. Sign template for submarine crossings is in Appendix 2, number 4. A large sign is required where there is poor lighting or a distracting background, however this situation should be avoided wherever possible.

## **4. OVERHEAD CROSSINGS**

### **4.1 Aim of these provisions**

The aim of this section is to assist crossing controllers to determine the appropriate location, minimum design height and signage requirements for a new overhead crossing or one which is being modified by the crossing controller.

### **4.2 Factors to be considered when determining location and height**

When planning a new overhead crossing, or when planning modifications to an existing overhead crossing, controllers are to undertake appropriate research in accordance with the provisions of paragraphs 7.1 to 7.6. In particular the crossing controller is to seek NSW Maritime's input in relation to its navigation safety requirements.

Appendix 1 (Establishing the Context) provides a detailed guide to the matters to be investigated when planning a new overhead crossing or modifying an existing one. Below is a general overview of the factors to be considered.

#### **4.2.1 Accessibility to the waterway**

Consideration should be given to the possibility of a vessel entering a waterway from any location and by a variety of means. For instance, a vessel conveyed by a 4 wheel drive vehicle may be used on a waterway which would otherwise be considered inaccessible.

#### **4.2.2 General environmental considerations**

The location, installation and signage of a crossing should be determined following careful consideration of scenic, amenity and other environmental considerations. For instance, disturbance to mangroves and seagrass beds, the impact on threatened species, populations, ecological communities or their habitats should be avoided, as should the impact on vistas, items of environmental (natural and cultural) heritage and the like. In this regard the crossing controller should consult, early in the planning stage, with all relevant authorities, such as the Department of Primary Industries (NSW Fisheries), the Department of Planning, Department of Natural Resources, the Department of Environment, Climate Change and Water and local councils.

### **4.2.3 Calculating minimum crossing design height**

The following factors are to be considered when calculating the minimum design height of the crossing. The minimum design height is to be maintained, over all parts of the navigable waterway, under all conditions and for the life of the crossing.

#### **4.2.3.1 Water levels**

In determining the appropriate height of crossings, the initial factor to be considered is the highest water level under normal conditions (ie discounting flood effects which are discussed in paragraph 4.3.5) relative to Australian Height Datum (AHD).

#### **4.2.3.2 Maximum vessel height**

This is the maximum vessel height above the waterline of the highest vessel which can be reasonably expected to navigate on the waterway in the vicinity of the crossing.

#### **4.2.3.3 Safety margin**

Based on the results of the risk assessment an additional allowance, or safety margin, should also be considered.

#### **4.2.3.4 Electrical clearance**

The relevant industry code (NENS04:2006) requires that clearance be made to accommodate the switching surge flashover distance.

#### **4.2.3.5 Other considerations**

##### ***4.2.3.5.1 Potential for movement of cables and structures***

Consideration should be given to the potential for the movement of the supporting structures.

##### ***4.2.3.5.2 Existing obstructions to navigation***

In some cases road and/or rail bridges, other overhead crossings, or similar, substantial, permanent obstructions to navigation, either exist or are approved for construction in close proximity to the proposed crossing. In these cases the height of the crossing may be determined following consideration of the following:

- the distance between the existing or approved obstruction and the proposed crossing; and
- the boating facilities and other boating attractions existing along the waterway or foreshore

between the obstruction and the proposed crossing.

Wherever possible, the cables should be integrated into the bridge structure. Care should be taken however to ensure that, if a vessel strikes the bridge, it does not make contact with the cables as well, thereby compounding the severity of the incident.

If attaching the cables to the bridge, or relocating the crossing, are not possible options, and the distance between the existing obstruction and the proposed crossing is minimal, the height of the crossing is determined by the existence of boating facilities and/or attractions between the bridge and the proposed crossing.

### **4.3 Signage requirements for new and modified overhead crossings**

This section provides a detailed explanation of the signage requirements for overhead crossings, based on the risk they pose to navigation safety. Sign templates are found at Appendix 2.

#### **4.3.1 Overhead crossings – Negligible Risk**

Crossings which the risk assessment indicates would pose a negligible risk do not require specific treatment options.

#### **4.3.2 Overhead crossings – Tolerable Risk**

Crossings which the risk assessment indicates would pose a tolerable risk must be developed in accordance with the following signage requirements. Consideration may also be given to signifying the crossing with markers such as coloured balls, coloured plastic coverings or similar which are to be in accordance with Australian Standard AS 3891.1:1991 and Australian Standard AS 3891.2:1992 – Air Navigation, as appropriate.

#### **4.3.3 General signage requirements**

- Generally, the selection and location of signage is to be such that a vessel operator is aware of a potential hazard at least 100m from the crossing. This is to enable the operator to manoeuvre away from the crossing if necessary. This distance may need to be greater depending on the prevailing local conditions (eg topography, winds and currents).
- All signage is to be bi-directional and oriented at 45° to the shoreline to enable it to be visible from all approaching vessels.
- The maximum vessel height above the waterline for which the crossing is designed is the height

to be marked on signs (see paragraph 4.3.2).

- In circumstances where crossings are located on waterways which are likely to be trafficked at night, consideration is to be given to lighting the associated signage.
- The sign templates in Appendix 2 have been prepared generally in accordance with Australian Standard AS 2416-2002 Design and Application of Water Safety Signs. It is recognised that Australian Standard AS 2416-2002 Design and Application of Water Safety Signs is intended primarily for signs at beaches, swimming pools and the like, however a more suitable standard is unavailable. Hence the sign templates have been developed following field analysis.

#### **4.3.4 Crossing warning sign requirements**

- The template for warning signs to be placed under overhead crossings is at Appendix 2, number 1. A large sign is required where there is poor lighting or a distracting background, however this situation should be avoided wherever possible. The use of this larger sign may also be considered where excessive waterway widths exist.
- The height and location of the sign support structures is determined as part of the risk assessment process including consideration of site specific features such as tide and flooding levels.
- For navigation safety reasons it is preferable for signage to be placed on the shore. The landowner/local council should be consulted in relation to such signs. In cases where the banks are obscured by mangroves and the like, or where the banks are particularly fragile, the use of in-water signs (other than buoy-mounted signs) near the shore may be appropriate.

#### **4.3.5 Additional requirements for waterways subject to flooding**

- On waterways which are subject to flooding a supplementary sign (template numbered 2 in Appendix 2) is to be attached to the crossing warning sign which clearly indicates to all vessel operators approaching from both directions that clearances are reduced during flood.
- During flood crossing controllers are to work in collaboration with SES and rescue personnel to promote navigation safety.

#### **4.3.6 Additional requirements for formal launching sites**

- If public launching sites exist on the waterway within 5km of an overhead crossing, it will be necessary to place the advisory sign (template numbered 3 at Appendix 2) at such launching sites. The landowner or local council should be consulted in relation to such signs. In the case of

other launching sites a risk management approach is required.

- If the abovementioned launching sites, carparks or access roads are located beneath the land based component of the overhead crossing, it may be necessary to place warning signs to assist in preventing accidents while towing or rigging operations are being conducted.
- The sign template numbered 3 in Appendix 2 may be used in other locations, as required by local circumstances, to raise awareness of the existence of, and dangers posed by, overhead crossings.

## 5. SPECIAL PROVISIONS FOR EXISTING OVERHEAD CROSSINGS

### 5.1 Aim of these provisions

The aim of this section is to outline the process for ensuring that existing overhead crossings do not pose unacceptable risks to navigation safety.

### 5.2 Navigation safety requirements

The following table provides a timetable for crossing controllers to assess and, if necessary adjust, existing overhead crossings and/or their signage.

Determining crossing heights, and their signage requirements mentioned in the table below, is based on risk assessment principles and refers to those described in the previous chapter.

#	Situation	Treatments required	Timetable for completion
1	Reported incident has occurred at overhead crossing	Analysis to determine explanation for incident and risk assessment completed - risk level to be as low as reasonably practicable through complying with overhead signage requirements, and other treatments if necessary	Within 3 months of date of implementation of the system or within 3 months of incident if incident occurs post implementation
2	All overhead crossings other than those in # 1 above	Risk assessment to be completed	Within 2 years of the date of implementation of the system
3	All overhead crossings for which risk assessment at # 2 above indicates an "intolerable" risk to navigation safety	Risk level to be as low as reasonably practicable through complying with overhead signage requirements, and other treatments if necessary	Within 2 years of the date of completion of the risk assessment in # 2 above
4	All overhead crossings for which navigation safety risk is assessed as "intolerable", following treatments at # 3 above	To be redeveloped as submarine crossings	Within first 15 year review period
5	All overhead crossings with signage which is not in accordance with the System after 2 years of its implementation	Prepare and implement signage replacement plans based on risk assessment principles	Implement 10 year signage replacement plans

## **6. INSPECTIONS, MAINTENANCE, REPORTS AND INFORMATION EXCHANGE, REVIEW AND CROSSING REMOVAL**

### **6.1 Aims of these provisions**

The following indicates the requirements in relation to inspections, maintenance, regular reporting, information exchange, reviews and the removal of existing crossings.

### **6.2 Regular inspections and maintenance**

It is the responsibility of the crossing controller to carry out regular inspections of crossings and their associated signage, to monitor the performance of each crossing and to ensure that treatments and controls are working as intended.

Such inspections will be performed regularly, particularly in high risk situations such as in areas prone to flooding and/or vandalism and the like, or on heavily trafficked waterways. Should any repairs, maintenance, vegetation trimming, or re-assessment of treatments and controls be required to an individual crossing, the crossing controller is to promptly undertake such work. The crossing controller is to keep records of inspections and maintenance works.

NSW Maritime's on-water officers will inspect crossings from time to time and will report any apparent anomalies to the relevant crossing controller for action. Using a risk management approach, NSW Maritime will also conduct compliance audits of individual crossings in consultation with crossing controllers.

### **6.3 Regular reporting and information exchange**

The crossing controller is to provide NSW Maritime with an annual report which is to confirm that the controller is complying with the new System. The report may be a copy of that provided annually to Industry and Investment NSW.

The crossing controller is to notify NSW Maritime's relevant Regional Manager within 24 hours of any incident involving a vessel and a crossing and which results in a fatality or serious injury to any person. A written report is to be forwarded as soon as practicable following the incident. In the case of a minor injury to any person, damage to property or "near miss" situation, a written report is to be forwarded by the crossing controller to the Regional Manager as soon as practicable following the incident.

As soon as practicable following a reported incident, the crossing controller is to undertake an analysis to determine an explanation for the incident. This is to be conducted in conjunction with relevant stakeholders, including NSW Maritime. The results of the analysis are to be used to make improvements as required in the table at paragraph 5.2.

For NSW Maritime contact details, including Regional Managers, see its website [List of NSW Maritime Offices](#).

Information sharing, including incident reports, is to be based on a three-way communication protocol between NSW Maritime, the crossing controllers and Industry and Investment NSW. Hence NSW Maritime and the crossing controllers will collaborate to develop a protocol for accurately recording incident data and relevant crossing attributes on NSW Maritime's Geographic Information System. NSW Maritime will make this data available to Industry and Investment NSW and crossing controllers.

#### **6.4 Regular reviews**

All crossings are to be reviewed by the crossing controller at least every 15 years. The aim of these reviews is to ensure that each crossing is suitable for the local conditions, current uses of the waterway and in line with the technology levels which exist at the time of the review. Factors include, but are not limited to, greenhouse impacts, dredging activities, current vessel design (particularly mast heights) and crossing technology. To assist in determining whether any changes to the crossing are required as a result of the review, a risk assessment is to be conducted in accordance with the new system (see paragraph 2).

#### **6.5 Crossing removal**

A crossing is to be removed if it is defunct or no longer required to supply services. All removals, including the removal of any associated signage, are to be conducted in accordance with the navigation safety requirements of NSW Maritime.

## **7. OBTAINING INFORMATION ABOUT NAVIGATION MATTERS**

### **7.1 Introduction**

Officers of NSW Maritime and relevant industry representatives and user groups are to be consulted as part of any proposal for a new or modified crossing and in the review process. Any modifications which may be required as a result of the investigations are the responsibility of the crossing controller.

The following section provides some useful contact details for use by the crossing controllers. These are current at the time of adoption or revision of the System but may be subject to change(s) at short notice.

### **7.2 Vessel traffic patterns and historical information**

NSW Maritime's Offices and Service Centres are located throughout NSW (see its website [List of NSW Maritime Offices](#) for details). Its regional staff may be able to provide information on vessel traffic patterns, the incident history of a particular waterway and/or an existing crossing, any user complaints relating to the crossing and any requirements for the installation phase.

### **7.3 Flooding and tidal information**

The relevant local council may be able to provide flooding information and details concerning the requirements of the environmental legislation. Information on tides, floods and water levels may be obtained from the Department of Natural Resources, the State Emergency Services, the Department of Commerce's Manly Hydraulics Laboratory (MHL) and/or the Bureau of Meteorology.

### **7.4 General information**

Relevant state agencies including, but not limited to, the Land and Property Management Authority, the Port Corporations, the Department of Primary Industries (NSW Fisheries), the Department of Environment, Climate Change and Water, Sydney Ferries, the Department of Planning and the Department of Natural Resources may be able to provide additional information. Information on existing or planned bridges may be obtained from the Roads and Traffic Authority, RailCorp or the relevant local council.

### 7.5 Boating industry information and user issues

The [Boating Industry Association](#) represents the interests of boat manufacturers, marine dealers and the maritime industry generally and should be consulted. Additionally the local NSW Maritime staff can provide information as to its “user groups” which are active in a particular area. Peak representative groups such as Yachting Australia, the NSW Waterski Association, the Australian Kitesurfing Association, the Boat Owners’ Association, the Australian Powerboat Association and similar groups should be consulted as appropriate.

## **8. SYSTEM AMENDMENTS**

The System will be reviewed by NSW Maritime, in conjunction with crossing controllers and Industry and Investment NSW, every 12 months, or as required to accommodate technological change and/or amendments to the relevant legislation.

## APPENDIX 1

### Establishing the Context

The following presents a summary guide to the key matters for consideration when planning a new overhead crossing, planning to modify an existing overhead crossing or conducting a regular 15 year review of an overhead crossing.

Broad topic areas for consideration	Detailed matters for consideration
Characteristics of the waterway	Locate proposed crossing on waterway Determine width of waterway at proposed sign locations Identify all navigable tributaries in vicinity Conduct research to identify current and tidal (HAT) characteristics relative to AHD Conduct research to identify flooding characteristics Conduct research to identify wave characteristics Conduct research into weather characteristics – eg frequency of heavy fogs Identify any barriers to placement of on-shore or in-water signage - eg seagrass beds, mangroves, bank instability Other
Accident history	Contact NSW Maritime for information re incidents which have occurred on this waterway, particularly any relating to crossings
Usage patterns	Determine all boating related land based activities in vicinity Determine all recreational water based activities in vicinity, including kitesurfing, parasailing and similar activities if relevant Determine all commercial water based activities in vicinity, including use of cranes, jibs and the like if relevant Determine location of marinas, moorings, popular anchoring sites, private landing facilities, boatsheds and the like in the vicinity Identify all nearby launching sites (formal and informal) Determine whether aquatic events take place in vicinity Determine daytime and night time usage patterns Determine type of vessels which can use waterway Determine height of the largest vessel which can navigate the waterway Determine whether any dredging activity is planned in the vicinity Determine all possible waterway access points, including tributaries and upstream Determine existing height limitations eg existing bridges Determine any developments/proposals which may have an impact on usage patterns Other

## APPENDIX 1 cont.

Broad topic areas for consideration	Detailed matters for consideration
Crossing characteristics	Conduct full risk analysis in accordance with AS/NZS4360 Determine type of crossing required Determine minimum design height if overhead Determine signage requirements Consider all alternatives and treatment measures Other
Consultations	Consult with NSW Maritime Consult with the Land and Property Management Authority and other landowners Consult with local council Consult with other agencies such as the Department of Primary Industries (NSW Fisheries); Sydney Ferries, Department of Planning, Department of Natural Resources, Department of Environment, Climate Change and Water, Department of Commerce (particularly MHL), State Emergency Services, Bureau of Meteorology, the Port Corporations (particularly with respect to any future dredging/port expansion activities) Consult with industry and peak representatives Consult with user and specific interest groups, particularly local groups Other
Calculations	Undertake necessary surveys
Signage characteristics	Consider characteristics of waterway Determine need for on-shore or in-water signs Consider appropriate location and size to provide at least 100m warning of the potential hazard Orientation of signfaces at 45° to shoreline If waterway subject to flood, incorporate supplementary sign to warn that clearances are reduced during flood Determine any lighting requirements Consider signage at launching sites; areas where vessels likely to be trailed and rigged Consider environmental impacts of signage and alternatives Consider installation issues particularly appropriate heights in terms of tidal range and flooding events Consider future maintenance regime Other
Other	Consider any other matters which may be relevant to the particular situation and location

## APPENDIX 2

### Sign Templates

This appendix provides the sign templates relevant to the crossing of navigable waters by electricity cables:

***Overhead crossings:***

Warning sign template:

1. Sign to be placed under the crossing.

Supplementary flooding sign template:

2. Supplementary sign to warning sign – clearance reduced in flood.

Advisory launching site template:

3. Sign to be placed at formal launching sites and other locations if appropriate.

***Submarine crossings:***

4. Sign to be placed at crossing entry and exit points.

1.



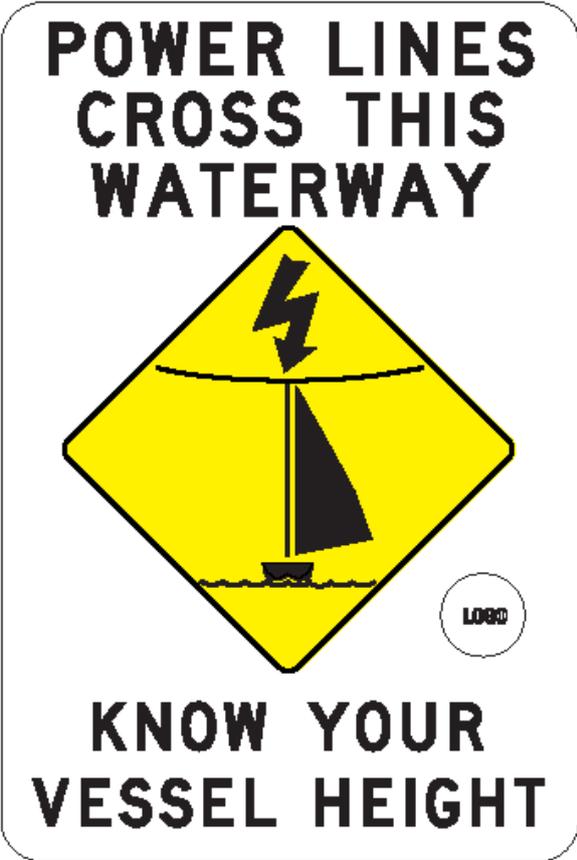
APPLICABLE TO BOTH TIDAL + NON-TIDAL LOCATIONS

2.

## **CLEARANCE REDUCED IN FLOOD**

**APPLICABLE TO BOTH TIDAL & NON-TIDAL LOCATIONS**

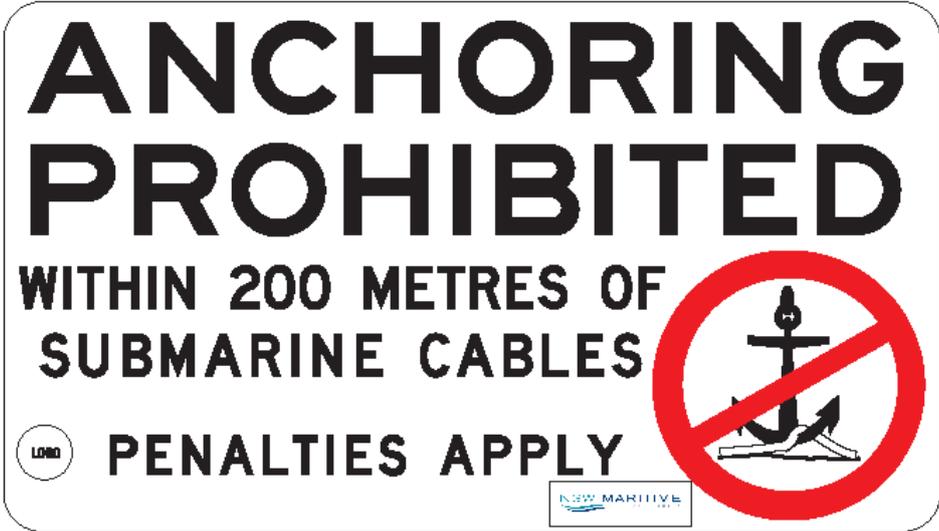
3.



**Boat Ramp**

**APPLICABLE TO BOTH TIDAL & NON-TIDAL LOCATIONS**

4.



## APPENDIX 3

### Education Sticker

The following is a template of the education sticker which is part of the proposed system of regulating crossing safety:

LOOK UP  
AND LIVE



YOUR VESSEL CLEARANCE IS

○ ○ ○ m

ABOVE THE WATERLINE

NSW MARITIME

Infoline on 13 12 56

CAUTION

Aluminium masts, wire rigging and aerials conduct electricity. Coming near to, or in contact with, a 'live' electrical power cable can cause severe injury or death. Even striking 'dead' cables can cause damage and lead to injury. Always check the working circumstances, signs no matter how often you have previously used this section of the waterway.

0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9
0	1	2	3	4	5	6	7	8	9

Instructions

1. Measure the height of the uppermost part of the vessel/mast above the waterline of the vessel.
2. Peel off the numbers which represent the height of your vessel from the bottom of the sticker and stick them in the circles provided.
3. Peel off the main part of the sticker and attach it at the normal steering position so that it is clearly visible to the person steering the vessel.
4. Look out for signs on the shore near overhead structures/cables to determine the maximum vessel height.
5. Take extreme care in floods and/or extremely high tides.
6. Remember, also check for low cables when rigging, launching and trailing.
7. Contact the NSW Maritime Info Line on 13 12 56 or your nearest NSW Maritime office for further information or to report any damage to cables.

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