

30 April 2024

Alexander Keller
Principal Planner
Development Assessment – South Team
Northern Beaches Council
PO Box 82 Manly NSW 1655

Dear Alex,

RE: Request for additional information
DA2023/0714 - Covenant Christian School 212 Forest Way, Belrose

This letter is provided and an addendum to the RFI response submitted to Council 10 April 2024 and is also provided for information purposes ahead of the scheduled Sydney North Planning Panel briefing meeting.

The purpose of this letter is to confirm the school's intended approach to on-site flood management and to confirm how the school intends to incorporate flood management into its operational procedures. The intention of these measures is to mitigate the safety risks associated with a probable maximum flood (PMF) event and to manage physical impacts from water ingress into Block D during a 1 in 100 year flood (1% annual exceedance probability (AEP)).

1. Flood Risk and Water Ingress – Block D

The flood management response detailed in this letter has been prepared following a review of the flood assessment report prepared by WMA Water (24 January 2024) which identified the associated risk, depth of inundation and entry points to Block D in a 1 in 100 year event as follows:

- The flood risk at the building in a 1% AEP event is considered to be minor, with flood depth being approximately 0.2 m at the upstream (southern) end of the building and reducing to approximately 0.1 m around the building (refer to **Figure 1**).
 - Entry 1 (main entry) peak flood level for near the main library entrance is approximately 158.3m AHD. The flood level is at least 0.1 m lower than the finished floor level, indicating it is unlikely to be inundated in the 1% AEP event.
 - Entry 2 is an existing entrance to Block D that will be removed as part of the proposal. The removal of this entrance means that this mechanism of inundation and the associated flood risk is removed with the proposed development.
 - Entry 3 The 1% AEP peak flood level at this entry is approximately 0.1m higher than the ground floor level, suggesting a potential for inundation. There may be water leakage around the door frame, though it's improbable to result in significant flooding or damage occurring within the building during a 1% AEP event



- Entry 4 Three (3) entrances have been proposed at this location, and water from the western side of Block D may flow down from the stairs to potentially enter one of these entrances. If water reaches the pathway on the northern side of the building, it may be directed eastward by an existing retaining wall. It is anticipated that any flooding on these floors would likely be minor and improbable to result in significant flooding or damage occurring within the building during a 1% AEP event.
- Entry 5 inundation is not possible at this location.

In response to the identified risk factors, Erbas & Associates Pty Ltd (Consulting Engineers) has prepared a Consultant Advice Notice (CAN) (**Appendix A**) outlining the school's intention to use a mobile self-anchoring flood barrier in conjunction with operation management measures to prevent water ingress into Block D. Bow Gould Architects (**Appendix B**) have included a flood design response to manage the residual risk of water ingress to the building during a 1 in 100 year flood event.

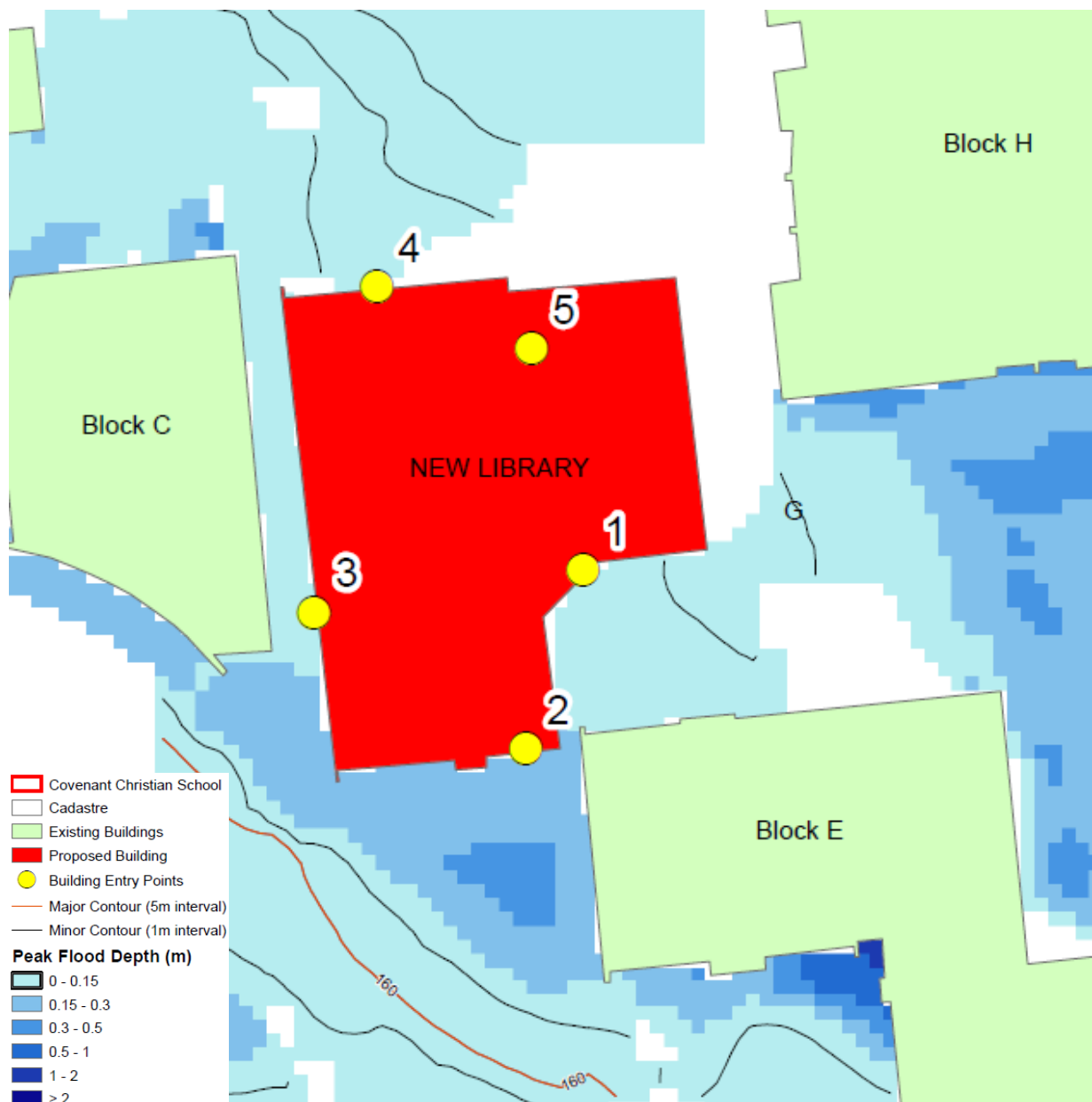


Figure 1: building entry points to Block D (new Library) (source WMA Water)

The report by WMA Water has also identified that in a PMF event, flood risk at the building would be moderate with flood depths being approximately 0.5 - 0.6m. WMA Water has identified that this would trigger a H3 flood hazard classification and has provided recommended emergency management procedures.

Draft conditions of consent in response to these recommendations and the updated flood management response are provided for consideration by Council and the Planning Panel (**Attachment C**).

The School proposes to incorporate the measures described in the Consultant Advisory Note (**Attachment A**) and updated ground floor plan (**Attachment B**) and requests that Council consider these items in accordance with Section 4.15 of the EP&A Act and, following the conclusion of the regional panel briefing, requests that the application proceeds to determination on this basis.

2. Amended and Additional Documentation

Table 1 identifies the drawings and documentation that have been amended from those originally submitted with the development application.

Table 1 Amended Documentation			
Ref Number	Drawing / Document Name	Revision	Date
Architectural Plans prepared by Bow Gould Architects			
DA_03	Ground Floor Plan	C	22/4/24

The following additional information is provided in response to the matters raised in Council's RFI letter dated 13 March 2024:

- An updated Ground Floor Plan which identifies flood design responses including:
 - A 35mm raised threshold for ground floor entry in accordance with AS1428.1
 - A waterproof membrane provided to a height of 50mm above the existing floor level
 - A concrete Hob to all ground floor windows will be provided to a height of 50mm above the existing floor level
- A Consultant Advisory Note (CAN) which confirms:
 - How the school intends to use mobile, self-anchoring flood barriers to manage the predicted 10 to 20mm of water ingress during a 1 in 100 year event
- Draft conditions of consent that:
 - Outline flood management procedures during the construction and operational phases of the proposal.
 - Require the preparation of a Flood Emergency Management Plan.

3. Conclusion

This letter has been prepared on behalf of Covenant Christian School to address the requirements of Section 37 of the EP&A Regulations. The proposed amendments to the DA will include a combination of operational management measures and infrastructure upgrades that respond to Council's RFI (dated 13 March 2024).

Pursuant to Section 4.15 (1) of the *Environmental Planning and Assessment Act* (1979) the amended proposal will result in no material change to the development's impacts to the natural and built environment or a material change to the social and economic impacts in the locality. As a result, the amended proposal will provide improved landscape, social and economic outcomes and the environmental impact assessment detailed in the Statement of Environmental Effects (SEE) prepared by EPM Projects remains applicable.

Therefore, it is considered that the proposed development satisfactorily responds to the opportunities and constraints of the site and the relevant legislation and is worthy of approval in its amended form.

Please do not hesitate to contact the undersigned if you have any queries or require further information.

Yours sincerely,

EPM Projects



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Attachment A – Consultant Advisory Note

Attachment B – Architectural Plans

Attachment C – Draft Conditions of consent

Attachment D – NOAQ Boxwall Specifications

ATTACHMENT A – CONSULTANT ADVISORY NOTE

Consultant Advice Notice (CAN)

Issued to:	Covenant Christian School	CAN Number:	CAN-001
Attention:	Andrew Lowry	Date:	30/04/2024
Project Name:	Covenant Christian School	Project No:	SYD24181
Subject:	Contentions	Author:	MS
Note:	This Consultant Advice Notice (CAN) is not an instruction to proceed with any works unless issued together with instruction from the Superintendent. Where this notice involves price variations or extension of time, such variations shall be submitted to the Superintendent and shall be approved in writing prior to commencement of work.		
With attachment:	No	Issued by:	Michael Slatter

This note looks to extend the conversations had to date about DA2023/0714 - Covenant Christian School and utilise the existing information to form a summary objective of the design stormwater services to alleviate concerns raised with relation to flooding at the site and specifically water ingress into the Ground floor of Block D

The detailed reporting from WMA dated 18th of December 2023 reference report number L231281 provides detailed summary detailed response to Council's request for information and also elaborates to the technical calculations required in support of the proposed alterations and additions to Block D.

This summary statement hopes to elaborate the intent of the pending design mitigations are provided in response to Council's request for information (13th March 2024) in order to address flooding and water ingress at the ground level of Block D. We understand that the development will include alterations and additions to Block D and will comprise the demolition of the existing Block D and demolition of the staff building. The development new incorporate new build elements to provide a combined library and staff centre (as defined within the development application documents).

The response to threshold protections will include modular barriers that can be quickly assembled and deployed by trained personnel and onsite maintenance staff. In sourcing appropriate equipment there are a number of reputable and readily available options. One such option is the Bluemont NOAQ Boxwall ([Flood Barriers | Mobile NOAQ Boxwall | Bluemont.com.au](#)) the Boxwall is a mobile self-anchoring flood barrier and can create a dam for water up to a height of 50 centimetres it is lightweight and easily set up and utilises the weight of the water as an active force to seal against itself.

Other options are available some more robust than others however it is the current proposal to utilise the Boxwall wall as part of a mitigation response to the current comments placed against the design.

The implementation of flood barriers is a part of the wider strategy for the site. Education, training and preparedness of site personnel and staffing is crucial to ensure the proper deployment of flood barriers.

Integration with Automatic Warning System is also proposed for the site to establish a seamless integration between the flood barrier deployment protocol and an automatic warning response system linked to the local weather bureau. This system will monitor weather conditions in real-time and issue alerts when there's a high risk of flooding. Alerts are to be disseminated through various channels such as SMS, email, sirens, and mobile apps. With the presence of maintenance staff year round at the school site in the occupied hours and on call 24 hours seven days a week early notification is important to the success of this strategy and this early warning system.

The design team will look to develop a clear response protocol that outlines the actions to be taken upon receiving a flood warning. This should include instructions for deploying flood barriers, evacuation procedures, and coordination with emergency services.

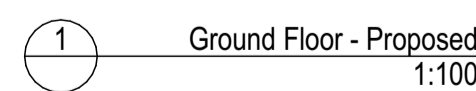
The analysis and requirements of floor levels for the new development is robustly elaborated and linked back to the development control plan requirements within the WMA report. It is not the objective of this consultant advice note to overtly summarise or reiterate information already available from the Flood engineers. We are also of the understanding that there may be amendments required to the flood reporting to accommodate the newly directed strategy.

There also exists potential to divert water away from the threshold via the amplification of the site wide infrastructure. This detail is yet to be fully developed however options exist for a new piped connection and amplified site drainage to increase the capacity and efficiency of the existing ground drainage and discharge points if necessary. Notwithstanding the knowledge that once a flood has been activated the parts in the surrounding infrastructure may be inundated therefore this is not a singular applied strategy but seeks to provide further options to assist in the mitigation of risk of the ingress of water to the development in pursuit of Councils agreeance of the proposed alterations and additions to Block D.

It is also worth noting that in alignment with the DCP listed requirement for flood proofing of services design actions will be implemented to raise the level of electrical services and protect from the ingress of storm water to any sewer drainage to meet the performance requirement of the DCP in this regard.

<END OF DOCUMENT>

ATTACHMENT B – ARCHITECTURAL PLANS



- FLOOD CONTROL NOTES:**
- AT THRESHOLDS TO LIBRARY,
A 35mm RAISED THRESHOLD WILL BE PROVIDED ABOVE EXISTING FLOOR LEVEL AS PER AS1428.1
- AT PERIMETER OF LIBRARY AT NEW AND EXISTING WALLS,
A WATERPROOF MEMBRANE WILL BE PROVIDED 50mm ABOVE EXISTING FLOOR LEVEL
- AT ALL WINDOWS TO LIBRARY,
A 50mm CONCRETE HOB WILL BE PROVIDED ABOVE EXISTING FLOOR LEVEL



FOR DA 22 APRIL 2024
NOTE: ALL DRAWINGS TO BE PRINTED IN COLOUR

RevID	Description	Date
A	ISSUE FOR DA	02.05.2021
B	8.5m BUILDING HEIGHT LINE ADDED	05.02.2020
C	FLOOD CONTROL NOTES ADDED	22.04.2021

DRAWING TITLE : DEVELOPMENT APPLICATION
Ground Floor

PROJECT NAME : **Covenant Christian School**

REVISION NO.
C
DRAWING NO.
DA-03

ATTACHMENT C – DRAFT CONDITIONS OF CONSENT

▪ Prior to obtaining a Construction Certificate

Flood Management - Construction.

Prior to the commencement of construction, the Applicant must prepare and implement for the duration of construction:

- a) flood warning and notification procedures for construction workers on site; and
- b) evacuation and refuge protocols.

▪ Prior to obtaining an Occupation Certificate

Flood design

Prior to building occupation the Applicant must provide the Certifier with documented evidence that:

- a) Door threshold levels are provided 35mm above the FFL and in accordance with AS1428.1
- b) Waterproof membrane is provided 50mm above FFL
- c) All ground floor window are positioned no less than 50mm above the FFL
- d) All ground floor power outlets are positioned 500mm above the required flood planning level of 159.08

Operational Flood Emergency Management

Prior to building occupation, a Flood Emergency Management Plan must be submitted to the Certifier that:

- a) has been prepared by a suitably qualified and experienced person(s);
- b) Is consistent with Flood risk Management Guideline EM01 of the Flood risk management toolkit
- c) Incorporates the following
 - i) the flood emergency management protocols for nominated staff in relation to flood mitigation barriers
 - ii) predicted flood levels within the site and within the adjoining road system and other public land expected to be used by students, visitors and caregivers;
 - iii) details strategies such as pre-emptive school closure, shelter in place and refuge protocols (where relevant)
 - iv) provides clear emergency management triggers and responses;
 - v) details of flood warning time and flood notification;
 - vi) identifies clear roles and responsibilities for emergency flood management within the school
 - vii) recognise that any flood response directive issued by the SES must be followed;
 - viii) the identification of access roads within the wider catchment, relevant to staff and caregivers, that will not be flood affected under certain flood events (not limited to PMF events)
 - ix) provide clear messaging and communication protocols
 - x) includes clear requirements that the Plan be regularly reviewed;
 - xi) include details of awareness training for employees, contractors, visitors, students and caregivers and induction of new staff members.
 - xii) The recommended flood emergency evacuation procedures identified by WMA water in the Covenant Christian School Flood Assessment (29 January 2024)
- d) A copy of the Flood Emergency Management Plan must be provided to the Northern Beaches Council within two working days of a request being made for a copy of the document.

ATTACHMENT D – NOAQ BOXWALL SPECIFICATIONS

NOAQ Boxwall BW52



The NOAQ Boxwall is a freestanding temporary flood barrier. It is designed specifically for the urban environment, with even surfaces like asphalt streets, but it works as well on lawns etc.

A NOAQ Boxwall BW52 is able to dam 50 cm of water and is self-anchoring. It is automatically ballasted by the own weight of the flood water. The higher the water rises, the harder the barrier is pressed firm against the ground. Utilizing the weight of the water, the barrier itself doesn't need to be heavy. Individual "boxes" weigh only 6.2 kg each and the barrier not more than 6.9 kg per meter. This makes it easy to use, and very fast. Two people can build 200 linear metres of boxwall in an hour.

A Boxwall is built by snapping the boxes together. No tools are needed. Gradual curves are made by connecting the boxes at a slight angle, and for corners there are specific corner boxes.

The Boxwall can also be used during a flash flooding event to divert water away from vulnerable areas. A number of boxes are put in the flowing water and will stick directly to the ground.

The boxes are stackable, which means they require very little space for storage and transport. 26 boxes (23 m) fit on a stan-



ward pallet, and a 40' container can take 1.1 km of Boxwall.

Damming ability	50 cm (20")
Dimension of boxes (lwxh)	980 x 680 x 530 mm
Effective length	900 mm (3') per box
Weight	6,2 kg (14 lb) per box
Speed of deployment	Ca 200 m per hour
Minimum curve radius	1,0 m (in both directions)
Material	Polypropylene
Temperature resistance	-30° – +90°C



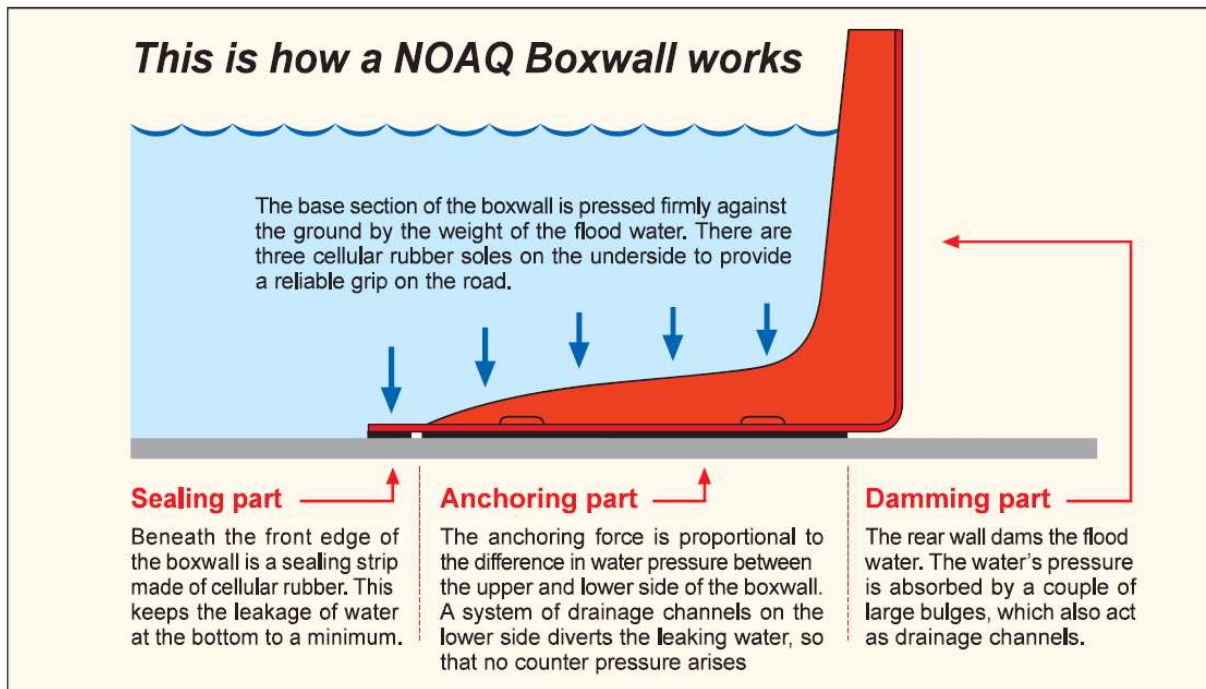
User instructions

NOAQ Boxvall BW52 (and BW50)

For instructions in other languages, see www.noaq.com



A NOAQ Boxwall is a mobile self-anchoring flood barrier. The NOAQ Boxwall BW52 creates a dam for water up to a height of 50 cm. The boxwall is so light that it can quickly be set up to protect buildings and other property against water damage, and also to keep roads open. A boxwall is designed for use on an even surface, such as a paved street, a concrete floor or a lawn. The boxwall is patented in a large number of countries. The BW52 model replaces an older version BW50, but the two models are fully compatible.



Each box consists of a damming part (the rear wall), an anchoring part (the horizontal section that rests on the ground) and a sealing part (the front edge of the horizontal section). Sealing strips of cellular plastic are fitted under the front and side edges. Each box is also fitted with a pair of cellular rubber soles to create a good grip on the road.

A boxwall is built up by snapping boxes one at a time onto the previous one. The easiest way is to work from left to right (viewed from the dry side). You should avoid working from two directions, as it is difficult to make the two wall sections meet at exactly the same point.

As with all mobile flood barriers you need to count on a certain leakage. This can be minimized by covering the barrier with a plastic liner. But water is also leaking through the ground under the barrier. Water may also come to the protected area as rain and through brooks which have been cut off by the barrier itself. **Therefore one or more pumps must always be put on the intended dry side of the barrier.**

The Boxwall components can also be used to create temporary basins of various size, so-called Boxpools. For the Boxpool there is a separate user instructions.



BW50-OC, BW50-IC, BW52, BW50

Follow these instructions:

1. Inspect the area where the boxwall is to be constructed

The boxwall has been specially designed for firm, even surfaces such as asphalt, concrete, lawns etc. It is therefore ideal for setting up on streets and paths, across car parks, in industrial areas, around shopping malls, in harbours and at airports. It must not be used on surfaces that are very uneven or on ground that is prone to erosion. Inclinations of the ground of up to 1:10 is no problem, but abrupt transitions from a surface with one inclination to an other need to be done perpendicularly. Holes or bumps should be avoided. The boxes are 980 mm long but overlap one another, which means each box adds 900 mm to the total barrier length (for the BW50 the corresponding numbers are 705 and 625 mm resp). A boxwall requires a free width of 680 mm.

Loose sand and gravel must be brushed away from where the wall is to be erected. The soles attached beneath each box have just as good a grip as the rubber soles on your shoes. If there is sand on the road you run the risk of slipping, and the same applies for the boxwall.

The coupling between the individual boxes has a built-in flexibility of $\pm 3^\circ$, which means a boxwall can be drawn in curves. For abrupt changes in direction there are certain corner boxes. These have an angle of 30° and are available for both inward and outward corners.

The boxwall can be placed on land that is already flooded, but if the ground surface is difficult to see through the water, you must take particular care to make sure that the boxes are not placed on uneven surfaces, on the wrong side of surface water drains, etc

The boxes are easy to handle and move, and you can also adjust the setting of a constructed boxwall as long as the water has not started to press firmly against the base. But you must avoid dragging the boxes on the ground, as the sealing strips on the underside are vulnerable to wear and may become damaged.



2. Lay out the boxes and connect them one by one

Start from the left (seen from the dry side) and connect the boxes one at a time to the previous one. The boxes have a **coupling mechanism** (at the front) and a **locking mechanism** (at the top). Tip the box slightly forwards and connect it with the previous box by inserting the protruding "tongue" (on the far left) beneath the "bridge" (on the right-hand side of the previous box).

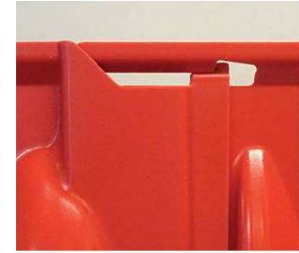
Now lean the box a little to the side, press down its rear edge and insert the pin of the locking mechanism into the groove in the previous box. Turn the box so that the pin ends up in the middle of the groove. This is the normal position. Straight boxes are now connected in line and corner boxes in a 30° angle. However, the locking mechanism has a certain flexibility allowing the boxes to be turned $\pm 3^\circ$ against one another.

On the previous model BW50 a clamp was put on each connection. This is no longer needed for the BW52, nor for the corner boxes BW50-IC and BW50-OC.

To help the sealing strip underneath create a tight seal against an uneven surface, you can place a weight on the front edge of each box, for example a stone or a sandbag. It can also be necessary to ballast the boxes in this way if there is a strong wind, before the water arrives. The boxwall is not very susceptible to winds coming from the front, but winds from behind will try to lift it.

Also when deploying a boxwall in deep water the boxes need to be ballasted from start to prevent them from floating. A difference in levels between the water in front of the boxwall and behind it is necessary to achieve the pressure difference that keeps the barrier in place.

If you want to improve the seal, you can cover the boxwall and its connections with a specific thin plastic sheeting, a liner. The sheeting is 2.0 m wide and can be fixed with clamps along the upper edge and with a line of gravel or sandbags on the ground in front of the front edge. By covering the boxwall with a plastic liner it can also be used on a much more uneven ground, as the liner is more flexible.

**Assembly position****3° in one direction****Normal position****3° in the other direction**

3. Corners

To create corners there are a couple of corner elements, one for outward corners and one for inward ones. Both have an angle of 30°, so three connected boxes make a 90° angle. Corner boxes can easily be connected to straight boxes, and with one another, as they all share the same coupling mechanism.

Outward corner boxes may be used to protect a single object, like a detached building. To surround a rectangular area, 4 x 3 outward corner boxes for the corners can be combined with an appropriate number of straight boxes for the sides.

Important!

Floods result from a course of events controlled by forces of nature that can only be controlled to a limited degree.

Furthermore, no two events are the same, which means that all protective equipment must be used not only with good knowledge of its function and limitations, but also with generally sound judgement. Those who provide the equipment, manufacturers, resellers, hirers, etc. can never accept liability for the actual use and any possible personal injury or damage to property that might arise.

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