IECA URBAN STREAM WORKSHOP

Stream Management – an urban context

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Soil Conservation Service

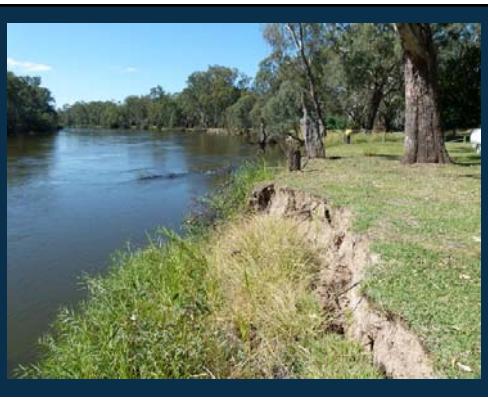
Contents

"The stream works will create a
dynamic stability
where the natural stream
forming processes of erosion and
sediment deposition can take place
within the confines of the channel
but
will not change dimensions during
engineering timeframes, or damage
nearby roads and housing infrastructure ."
(Landcom, 2003)
(emphasis added)

What is an urban creek?

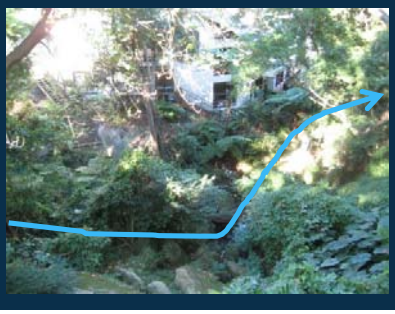
Characteristics of urban settings:

- An urban setting that is immediate, or anticipated.
- Often referred to by planners as "blue-green corridors"
- Associated with parkland or recreational space
- Associated with stormwater and drainage assets
- Often already highly impacted by modifications
- High levels of community and stakeholder interest
- May not conform to "traditional" restoration guidelines
- *Characterised by CONSTRAINTS rather than OPPORTUNITIES*



Eastwood

Mosman



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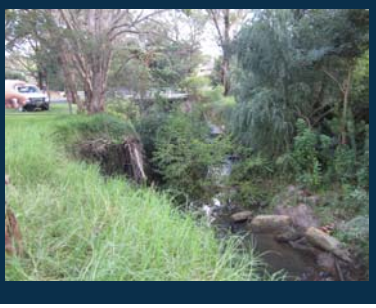

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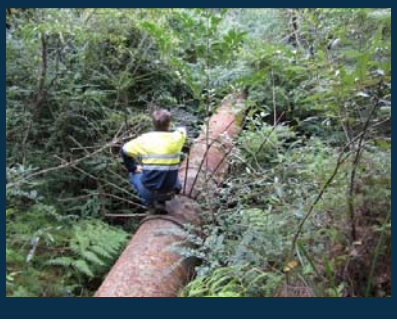


What is an urban creek?

What happens in an urban creek:

Catchment has been developed

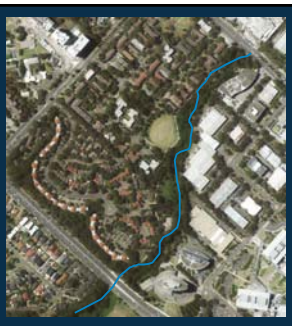
- Change to the catchment's physical character → increase in hard area
- Change to stormwater flow through pipes
- Change in flood models

Construction activities have happened or will happen

- Increase in stream sedimentation during catchment development
- Reduction in stream sedimentation when catchment is fully developed
- Installation of services (particularly stormwater and wastewater)
- Construction of assets within floodplain areas or adjacent to waterways

The creek has been directly changed

- Channel straightening, armouring, installation of GPT, bridges and culverts



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Shrimptons Creek, Macquarie Park

What is an urban creek?

Narrow, cramped and access is difficult

Services are located in or near the stream, banks or floodplain

Water quality is changed

Contamination may be present – PASS, hazardous materials, rubbish

Weed infestation

Lack of connectivity to floodplain

LACK OF APPROPRIATE REFERENCE REACHES

Why is urban stream restoration needed?

"Prevention is better than cure"

Market analysis of projects in Sydney showed that:

- 65% of projects were related to asset protection
- 20% of projects were related to flood mitigation
- 15% of projects were considered "beautification"

Why is urban stream restoration needed?

Asset Protection

Typically because assets are currently, or about to be, under threat of erosion.

Houses
Stormwater assets
Wastewater assets
Bridges and roads
Gross Pollutant Traps

Significant trees
Endangered Ecological Communities
Threatened species
Habitat protection

Why is urban stream restoration needed?

Flood Mitigation

EITHER because changes to the catchment have resulted in the need for:

Increased conveyance, capacity

OR because changes to the stream have resulted in the need for:

Removal of obstructions (e.g. trash, sediment)

The aims of stream restoration

If our aim is simply to "protect assets" or "reduce flooding" then engineering solutions are readily available.

However!

(I don't think we want concrete channels or gabions!)

A good designer will not only address the initial cause, but deliver multiple benefits.

The aims of stream restoration

Why we need "multiple benefits" in a stream restoration

1. There is a financial benefit to doing the works
2. It aligns with our greater planning visions for enhanced natural areas
3. Increases stakeholder engagement and acceptance
4. Increases resilience of the waterway
5. Unlocks funding???

And generally – we only get one chance to work on a reach!

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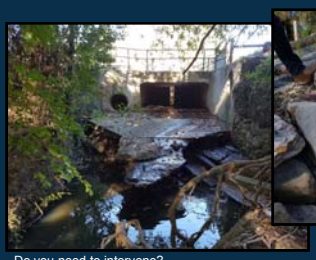
Opportunities & Benefits

Erosion Control & Asset Protection



Do you need to intervene?
Not all erosion is bad erosion

Reduce flow velocities and increase roughness

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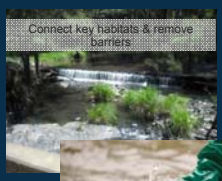
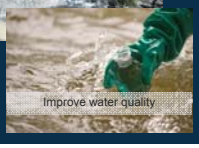
Opportunities & Benefits

To provide "ecosystem services"

Increased habitat & geomorphic diversity



Connect key habitats & remove barriers



Improve water quality

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Opportunities & Benefits

To improve liveability, health & wellbeing

'*Green spaces are important indicators of quality of life in cities and suburbs……benefits include physical, mental and social health and wellbeing.*' (Farahani & Maller, 2017)

Accessible spaces ?

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Key Constraints

What are the major constraints that impact design & construction?

- Site Access & Footprint
- Environmental Considerations
- Hydrological Setting
- Community Goals and Stakeholder Engagement

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Key Constraints

Access & Work Footprint

Minimise impact of site compound, material delivery & work footprint

Restricted access to site

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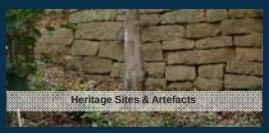
Key Constraints

Environmental Considerations


Working in Endangered Ecological Community


Acid Sulfate Soils, contaminated fill & debris


Heritage Sites & Artefacts

Key Fish Habitat ?

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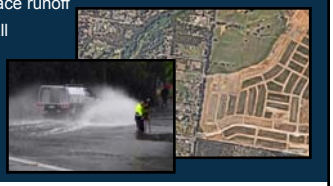
Key Constraints

Hydrological Setting

- Differing hydrology to rural catchments
- Increased flow volume and velocity
- Increased frequency of high flow events (Flash Floods)
- Increased frequency of surface runoff
- Reduced infiltration of rainfall



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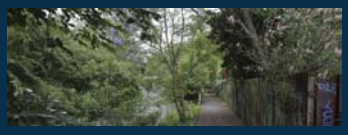
Key Constraints

Community Expectations & Goals

- It's important to consider the goals of the project
- Public access and interaction with the site ?
- Bush landscape with ecological goals ?
- Public safety and visibility
- Sense of ownership of public spaces



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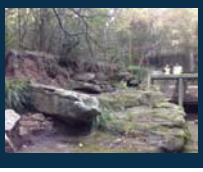
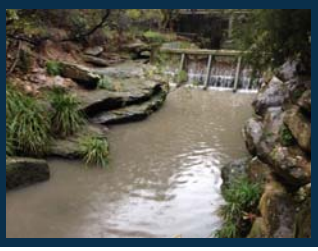
Worked example 1 – asset protection

Dairy Farm Creek, Georges River Council & SCS

An existing GPT is being outflanked, erosion threatens bushland and a service trail





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Worked example 1 – asset protection

Consider the constraints

Immediately downstream of a large Sydney Water culvert
Immediately upstream of a wetland system
Adjacent to high-value bushland with community engaged
Adjacent to a service trail for Council, Syd Water and RFS
Hydrology much changed by shape of upstream bridge (which impounds and jets water through to the GPT) → increased velocity
Head difference 1200 mm
Must not change upstream flood extents

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Worked example 1 – asset protection

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Worked example 1 – asset protection

Dairy Farm Creek, Georges River Council & SCS

Use of natural materials, in keeping with surrounding bushland

Use of engineered approach in service trail location (structural engineer)

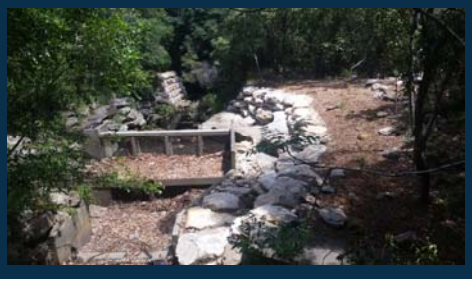
Construction works designed to have least impact on high-value bushland, and not affect Syd Water assets

Assessment and consideration of other areas of the creek (upstream and downstream)

Use of engineered approach to determine flood impacts (Habib from Hydrostorm)

Worked example 1 – asset protection

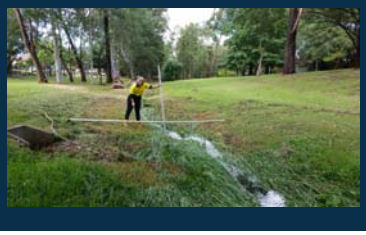
Completed product



Worked example 2 – bed controls

Jim Walsh Park, Eastwood – City of Ryde Council

An existing creek-line within an open parkland setting has weed problems, deep pools and is incising rapidly



Worked example 2 – bed controls

Consider the constraints

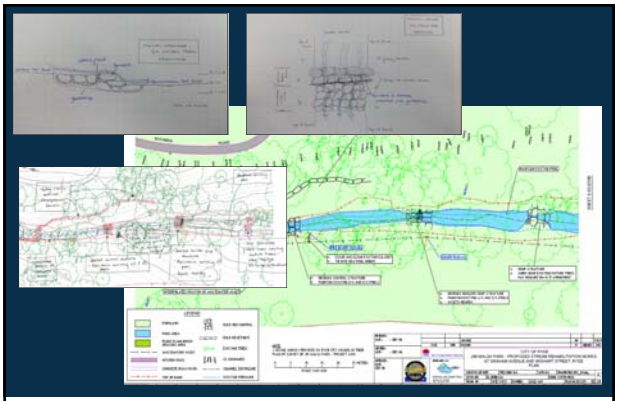
Heavily used parkland (it has its own Facebook page!)

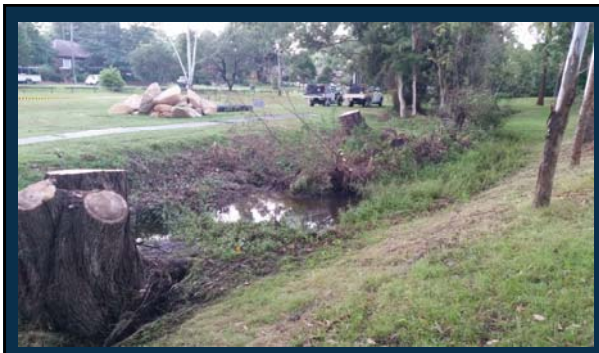
Well-established willow trees

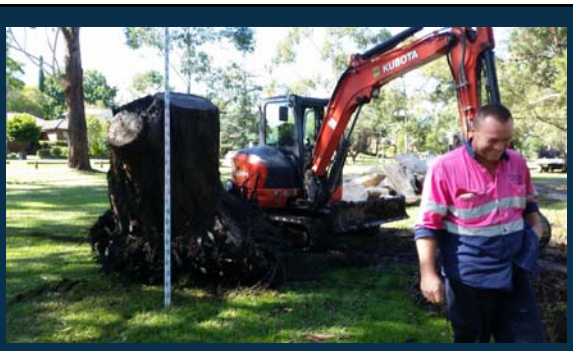
Wastewater asset running alongside the creek

Bridge in upstream extent impounding water → higher local velocity at "outlet"

Works to be sympathetic with surrounds







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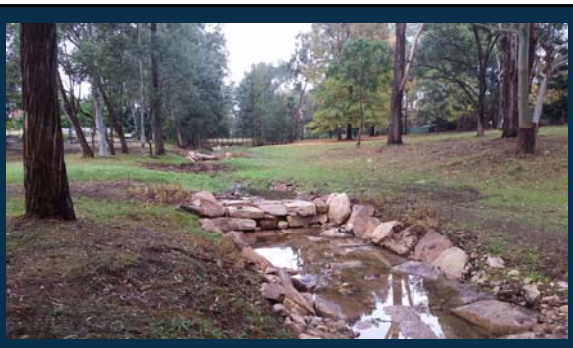

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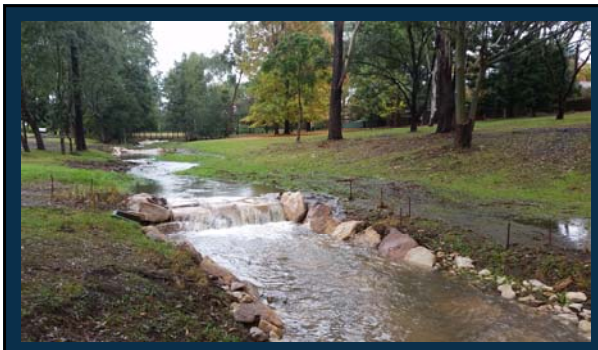

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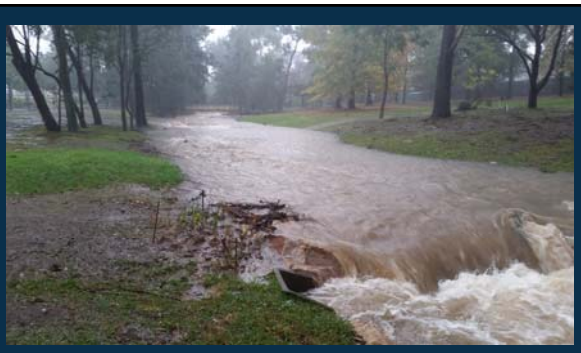

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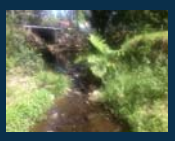
THIS AFTERNOON'S SITE VISIT

Terry's Creek, Eastwood

Meeting with:

Sandra Payne, Natural Areas Coordinator, City of Ryde Council

Don Wilson, local resident, arborist



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THIS AFTERNOON'S SITE VISIT

Site constraints:

- Each bank owned by different Councils
- Working in two EEC's (BGHF and STIF)
- Working near assets in bank (wastewater)
- Working near assets in stream
- Working near unknown assets (redundant Telstra mains cable)
- Asbestos contamination
- Access difficulties
- High levels of weed infestation
- Transport of materials on site through the creek
- Material sourcing (logs)
- Working in areas with high levels of community engagement (Bushcare)
- Working in proximity to popular walking track (Terry's Creek to Lane Cove NP)
- Working in proximity to playgrounds and playing ovals

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In Summary:

There are often many more "constraints" on an urban site

This doesn't mean that opportunities cannot be found

Multiple benefits are possible, this requires careful consideration!

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Thank you

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