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18 July 2018

Reflections Holiday Park
Attn: Andrew Stone Senior Property Manager
17 Gipps Street
Carrington NSW 2294

Andrew:

Terrace Reserve Holiday Park, Brunswick Heads

I am responding to your request for details regarding developments in close proximity to coastal cypress, *Callitris columellaris,* which I have been involved with. These include the *Byron at Byron* and the adjoining *Cypress* developments at Suffolk Park.

Development consent for both of these projects dates back to over a decade ago. Both projects involved construction works through the structural root zones and within the tree protection zone of coastal cypress. These zones are defined under AS 4970-2009 (*Protection of trees on Development Sites*). Both projects included compensatory measures for trees potentially impacted.

I undertook a site inspection of the Terrace Holiday Park on 30 June 2018 to draw comparisons between the age/size of coast cypress at the park and those at the development projects detailed above. I also examined potential and existing impacts (e.g., trees located proximal to access roads and tree structural damage) (Plates 1 and 2) and reviewed amelioration measures described in the arborist report (ArborSafe May 2018) and the ecological report (Ecological Consultants Australia 2018).

Plate 1: Access road adjacent to coast cypress

Plate 2: Coastal cypress with bitumen paving over structural root zone

I draw the following comparisons between the coast cypress at the Byron at Byron Cypress and the Terrace Holiday Park:

- The trees at all sites appear to be of a similar age class;
- The trees the Terrace Holiday Park exhibited signs of the operational use of the Holiday Park (some 80 years) which appears to be by virtue of the locations of trees in proximity to roads and other infrastructure, this is in contrast to the pre-development state of the Byron at Byron and Cypress sites where this community was unmanaged; and
- The recommendations contained in the arborist's report for the Terrace Holiday park are similar to protection measures adopted at the Byron at Byron and at Cypress, Suffolk Park.

Impacts to coast cypress at the Byron at Byron and at Cypress over the past decade have been negligible. This is in contrast to the pre-development state where this community was unmanaged.

The coast cypress community at the Terrace Holiday Park has similar pre-development issues as those which faced the respective Suffolk Park developments. The mapping of the coast cypress at the Terrace is the first stage in protection. The arborist report describes reducing potential impacts such as removing caravan sites, relocating impacts outside of tree SRZs and the introduction sub-surface stabilisation measures such as econogrip (see attachments), all of which I support.

Subsurface stabilisation was used at Cypress at Suffolk Park to great effect. However, as the vehicle movements at the Terrace would vastly exceed those at Cypress this mitigation measure would be even more beneficial to the health of the coastal cypress trees. As a future consideration, bitumen pavements at Terrace could also be replaced with EconoGrid40, thus removing impervious surfaces from tree SRZs.

Should you require any further information, please do not hesitate to contact me.

Yours sincerely,

References

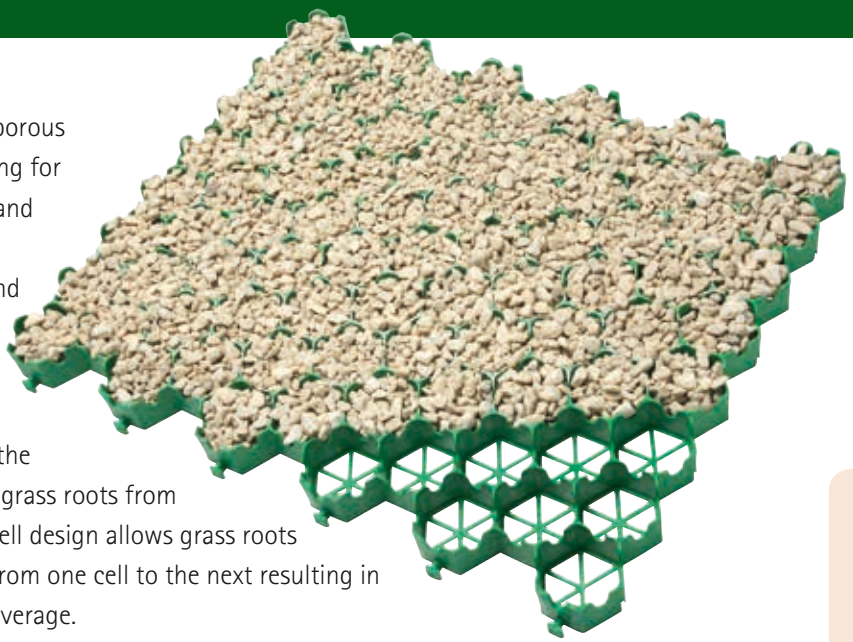
ArborSafe May 2018, Terrace Holiday Park, Southern Sector, Arboreal Impact Assessment. A report to Terrace Holiday Parks.

Ecological Consultants Australia Pty Ltd 2018 *Ecological Considerations of Vegetation Management Terrace Holiday Park southern sector.* A report to Terrace Holiday Parks

EconoGrid40™ Installation Guide

All Stake Supply
ENVIRONMENTAL TERRAIN SOLUTIONS
Established 1976

TERRAFORM
Terraform is a registered trademark of All Stake Supply Pty Ltd



EconoGrid40 provides a porous reinforced surface allowing for frequent pedestrian, car and heavy vehicle traffic. An alternative to concrete and asphalt, EconoGrid40 is suitable for both grassed and gravel areas.

The 40mm deep cells on the EconoGrid40 protect the grass roots from damage and the indent cell design allows grass roots to grow unencumbered from one cell to the next resulting in stronger, thicker grass coverage.

Light, environmentally friendly and with a unique interlocking mechanism on each paver, EconoGrid40 is easy to install saving time and labour.

APPLICATIONS

- Parking areas
- Nature strip
- Caravan Parks
- Emergency vehicle access
- Horse and Livestock Stables

INSTALLATION METHODS

1. Excavate the ground to the required depth (generally 190mm, 100mm for the sub base, Underlay and Econogrid40 require 40mm each and 10mm turf) and compact ground making it uniform and level.
2. The sub base layer of gravel/aggregate needs to be a minimum depth of 100mm, uniform in thickness and level. Sub base particles should not exceed 75mm. If axel loads will be greater than 60kn (approx 6 tonnes) a minimum of 150mm is required with a geogrid between the ground and sub base. *Note: Where existing ground conditions are firm (i.e. CBR > 7%) and free draining or where a suitable hardcore/stone base already exists, the requirement for a sub base layer is removed.*
3. Prior to laying the underlay a 120gsm filter fabric may be placed over the sub base or existing soil profile, this stops the growing medium dispersing into the sub base. Turf underlay should be a 60:40 mix between 40-50mm thick after consolidation – for greater turf performance mix Terraform Plant Establisher into the Turf underlay. For gravel, underlay should be 40-50mm of 10-20mm diameter angular gravel or crushed aggregate.
4. Start in a corner and install by rows laying out the EconoGrid40 onto the underlay connecting the panels with the inbuilt connects as you go. Pavers can be cut to fit around obstructions and curves using a hand or power saw.

Mix in Terraform Plant Establisher to soil base for better grass performance

Start in a corner

Pavers can be cut to fit

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EconoGrid40™ Specification

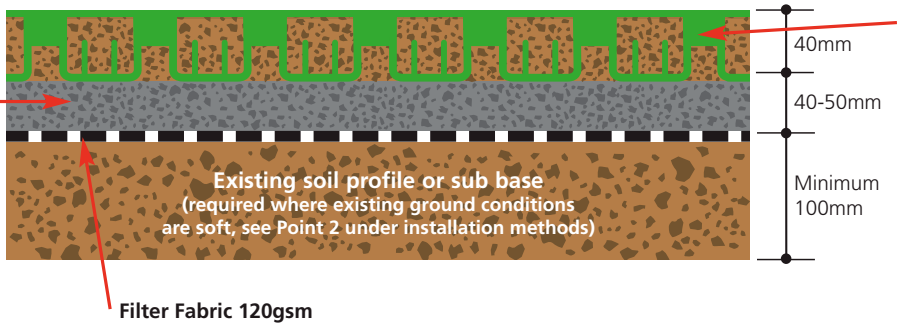
5. Fill pavers with specified soil to finished levels 5-7mm below top of cells after settlement. This allows the crown of the grass to be below the parapet of the pavers (and therefore protected). Turf can now be rolled onto the fill grids. Roll and water turf as per normal installation. If using a gravel finish fill EconoGrid40 with angular aggregate or gravel 5-20mm in diameter, lightly compact to finish.
6. Surface can be trafficked immediately however best practice would be to allow turf to establish itself, generally 3 to 4 weeks.

PAVING GRID DESCRIPTION	PAVING GRID DATA
Product	EconoGrid40
Material	100% Recycled high density polyethylene
Colour	Green
Paver dimensions	638 x 532 x 40mm (3 pavers per m2)
Cell wall thickness	0.2mm
Weight (Nominal)	1.36kgs per paver
Load bearing capacity (filled)	150 tonnes/m2
UV stabilised	Yes

EconoGrid40 has been tested in accordance with ASTM D1621-10

Underlay for Gravel Surfaces
40-50mm thick layer of 10-20mm diameter, angular gravel or crushed aggregate

Underlay for Grass Surfaces
40-50mm thick layer of 60:40 sand/soil

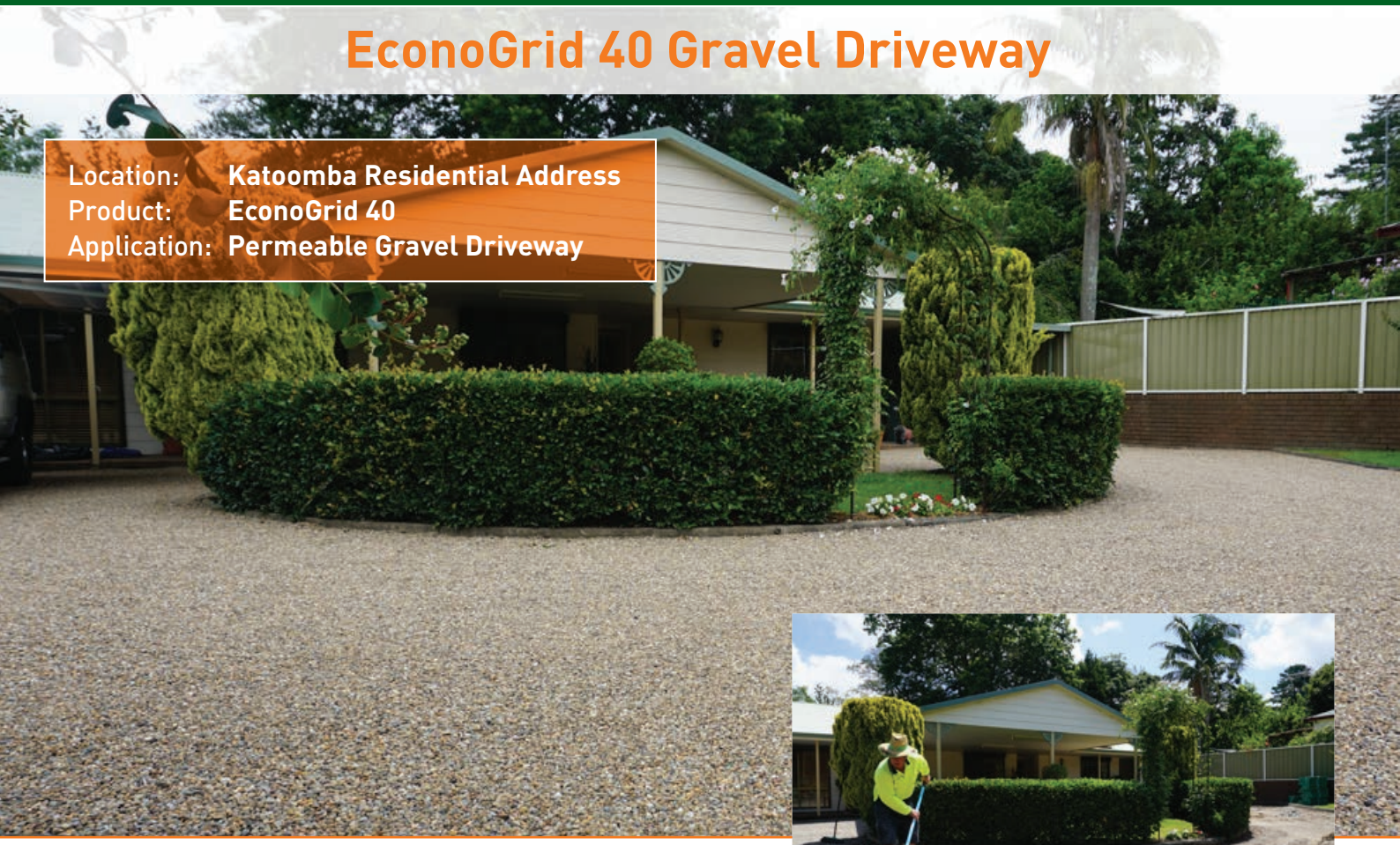


Econo Grid 40
40mm deep UV stabilised pavers filled with gravel/angular aggregate (5-20mm) diameter
Or
For Turf filled with 60:40 sand/soil

Disclaimer: Please note that the information is given as a guide only. All sizes and weights are nominal figures and may vary to what is published. Specifications on each site will be different so the final determination of the suitability of any information or material for the use contemplated and the manner of its use is the sole responsibility of the user and the user must assume all risk and responsibility in connection therewith.

All Stake Supply **Case Study**

EconoGrid 40 Gravel Driveway



Location: Katoomba Residential Address
Product: EconoGrid 40
Application: Permeable Gravel Driveway

The Brief

Client required an economical low maintenance, permeable driveway, for their Campervan, 4WD and vehicles.

Solution

Econogrid 40 stabilizes the gravel removing maintenance issue such as ruts forming, gravel migrating due to tyre movement and or gravel sinking. Increasing the driveways strength and durability Econogrid 40 is an ecofriendly solution made from recycled material and is a cheaper alternative to concrete or asphalt.

Conclusion

It was very important for the client to have a permeable driveway that did not contribute stormwater runoff into the world heritage Blue Mountain National Park. EconoGrid 40 achieved this through its open honeycomb cell paver design. The clients filled the porous pavers with Nepean River bed stone to create a brilliant finish and feel to the driveway. Important to fill the pavers with an aggregate that does not have fine content and the stones are greater than 10mm, this maintains the permeability of the structure. Once the pavers are filled a load capacity of 150 ton is achieved and each paver locks together with our unique locking system to give further strength and durability. Installed by you or by a landscaper the EconoGrid 40 driveway is low cost option that stands the test of time and looks great.

preparing compacted base

Laying out Econogrid 40 porous pavers

Filling pavers with Nepean River Bed Stone