



12d® International Innovation Awards

Executive Summary

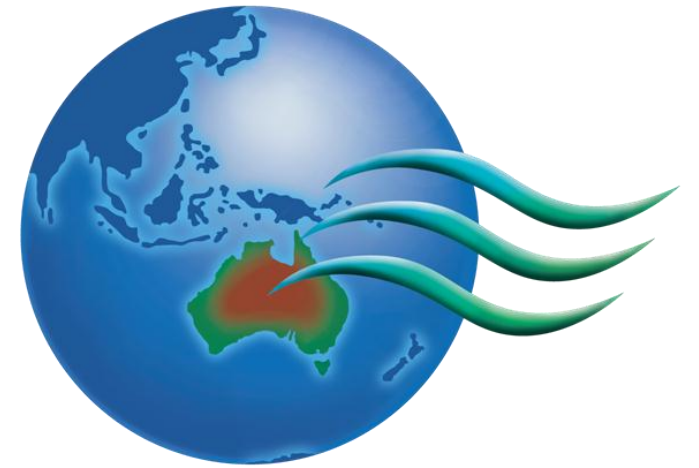
Name: Brent Gordon
Company: Dalton Consulting Engineers (DCE)
Name of Project: Pakenham Race Course
Awards Result: Third Place (Tied)

DCE was engaged by the Pakenham Racing Club as principal consultant for the design and construction of a new state-of-the-art, fully sustainable facility for thoroughbred racing, training and ancillary facilities -- including the longest home straight of any current racecourse in Australia.

Using 12d, DCE was able to create a comprehensive 3d design model of all civil works efficiently with a high level of detail and accuracy, while presenting deliverables with superior quality. 12d Model was used in conjunction with other software packages including Tuflow to undertake a detailed flood analysis of the site as part of the design process.

“Winning the bronze award at the 2012 12d international innovation awards, was just reward for all the hard work that was put into the Pakenham Racecourse project.”
--Brent Gordon





12d international innovation awards pakenham racecourse at tynong



MAY 2012
DCE PROJECT REF. 11537

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entry form

**description of
project**

problems faced

tasks undertaken

tuflow

visualisations

1.1 ENTRY FORM



Entry Form

Name Brent Gordon.....
 Position Design Manager.....
 Company Dalton Consulting Engineers.....
 Name of Project Pakenham Racecourse at Tynong.....
 Client Pakenham Racing Club.....

Description of Project
 Refer to Section 2
 Description of problem faced / task undertaken
 Refer to Section 3 and 4
 How the problem was solved
 Refer to Section 3 and 4
 Relevant 12d screenshots and/or data attached.
 Refer to Section 5 and 6

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description of project

DESCRIPTION OF PROJECT

Introduction	2.1
Site of Works	2.2
Masterplan	2.3
Scope of Works	2.4

2

description of project

2.1 INTRODUCTION

DCE was engaged by the Pakenham Racing Club as principal consultant for the design and construction of a new state of the art, fully sustainable facility for thoroughbred racing, training and ancillary facilities including the longest home straight of any current racecourse in Australia.

Using 12d, DCE were able to perform a comprehensive 3d design of all civil works efficiently with a high level of detail and accuracy, while presenting deliverables with superior quality.



2.2 SITE OF WORKS

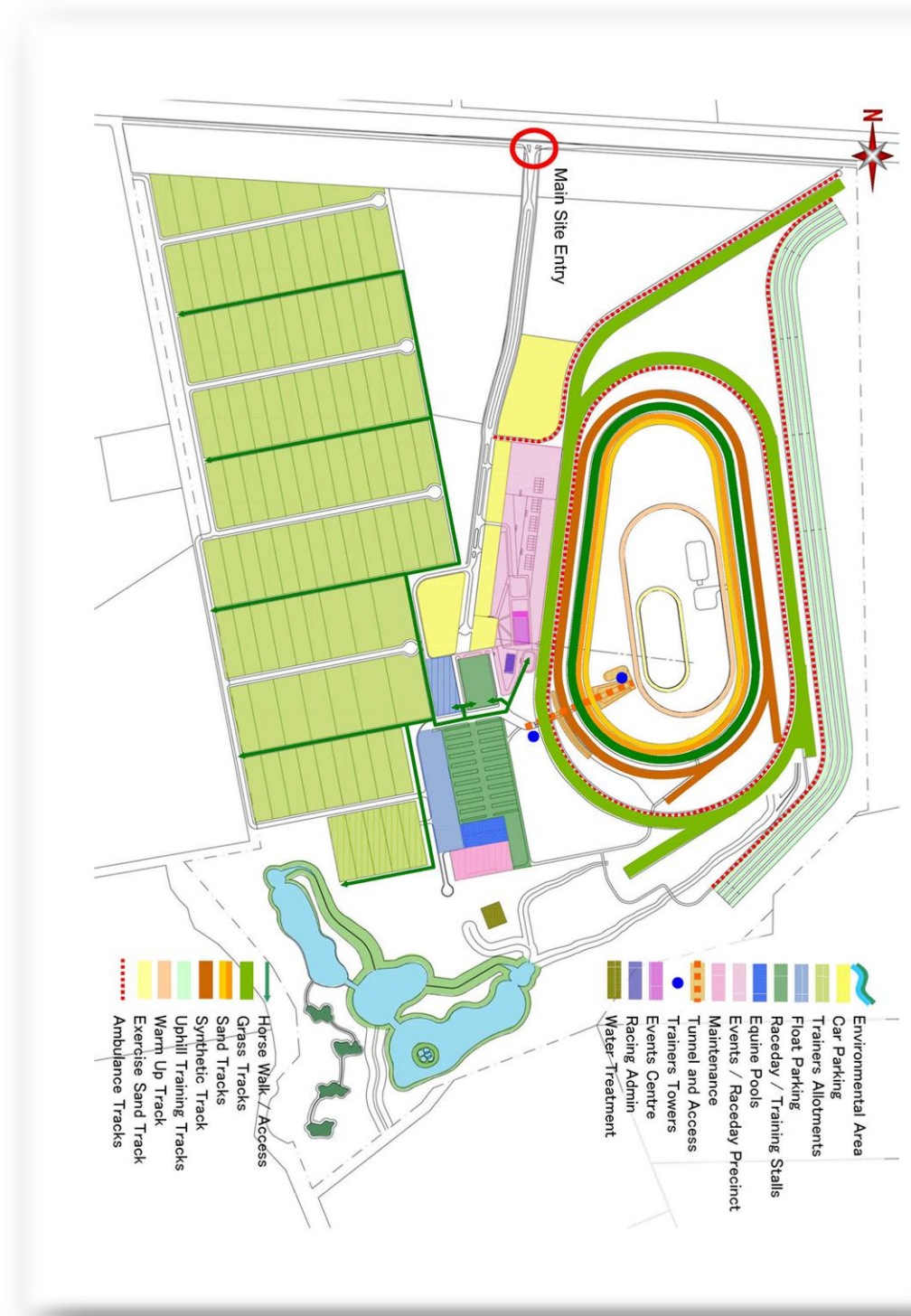
Pakenham Racing Club purchased the Greenfield site some 15km away from the original site on which it is to develop the new Racing and Training Facility. Upon completion the activities currently undertaken at the Pakenham Racecourse site will be relocated to the Tynong site, therefore enabling the sale of the current Pakenham Racecourse.

- The site is located 1km west of the Tynong Township
- Site Area = 246ha
- Replacing Existing 24ha racecourse



description of project

2.3 MASTERPLAN



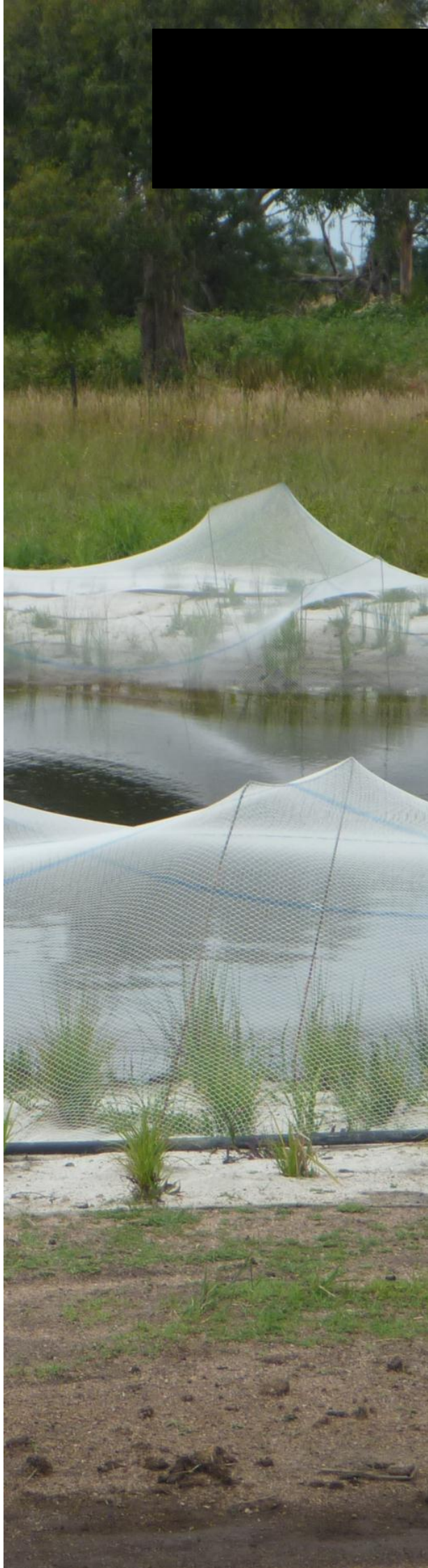
2.4 SCOPE OF WORKS

DCE used 12d Model to complete the civil design for:

- Bulk Earthworks of site (700,000 Cubic meters)
- 25m wide, 2,400m in Length Wide Course Proper including 1,000m of chutes.
- 4 Tunnels under racetracks
- Ambulance track for the whole circumference of the course Proper and 1200m chute.
- 10m & 6m wide Sand Tracks totalling 1,650m in length each
- Training Lights for the Sand Tracks
- Wetlands and 30 megalitres storage dam
- 4 Growling Grass Frog Ponds.
- 6 megalitres irrigation dam
- Sewer and Water Reticulation
- Main Entrance in accordance with VicRoads standards
- Over 2km of Access and Maintenance Roads.
- Carparking for over 2500 cars
- Main and local drainage networks
- Other ancillary works



problems faced



PROBLEMS FACED

Problems Faced 3.1

3

3.1 PROBLEMS FACED

The problems DCE faced were:

- *The new racecourse required full civil design for roads, underground drainage, sewer, water supply, tracks, flood ways, wetlands and frog ponds with sufficient information to produce construction documentation.*
- *Due to time restraints, several people worked on this design simultaneously to produce a fully integrated design of the entire site. In order to accurately match neighbouring works to each other, they must also have ready access to each other's design information.*
- *Furthermore, due to significant historical flooding at the site, detailed flood analysis of the site was required showing areas and depths inundation over time.*
- *Data was required to be exported in several different formats to other consultants, architects and contractors.*
- *Due to the public nature of the project, aesthetic visuals were required for advertisement and approval.*
- *The sheer size and complexity of the drainage network required the use of a singular network which could model hydraulic and hydrology data across the whole site.*



07/15/2010
** Existing conditions



** Visualisation of the proposed entrance

tasks undertaken

TASKS UNDERTAKEN

- Integration 4.1
- Drainage 4.2
- External Software Packages 4.3

4

tasks undertaken

4.1 INTEGRATION

Thirteen separate 12d projects were used to design the entire racecourse and associated works, with as many as 5 designers working on it at any given time.

The share and copy between projects functions allowed DCE to effectively interface our design with adjoining components and integrate them all together to create a final overall design.

It allowed DCE to share templates, MTF's, models and tins with live updating for when a designer was working in similar areas as another designer.



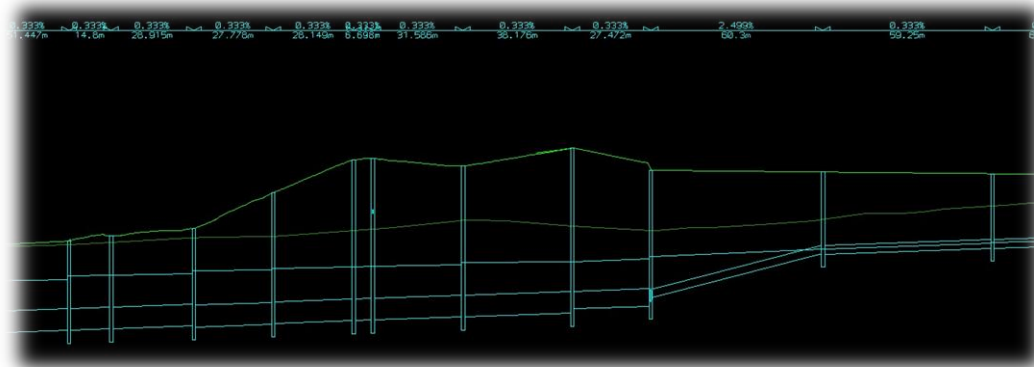
4.2 DRAINAGE

Using 12d's drainage package, DCE was able to model the entirety of the projects underground drainage as a single network.

The network contained:

- Over 14km's of pipework, some as large as 1800mm dia
- Over 20km's of subsoil drainage
- Over 360 pits and endwalls
- Over 240ha internal catchment
- Over 620ha external catchment

12d's network editor interface allowed us to simply modify common properties for catchment types, quickly make adjustments to cater for layout changes and integrate the entire site into a fully functioning model of the network with complete hydrology and hydraulic outputs.



4.3 EXTERNAL SOFTWARE PACKAGES

For further analysis of the project we were required to export data into external software packages. These included:

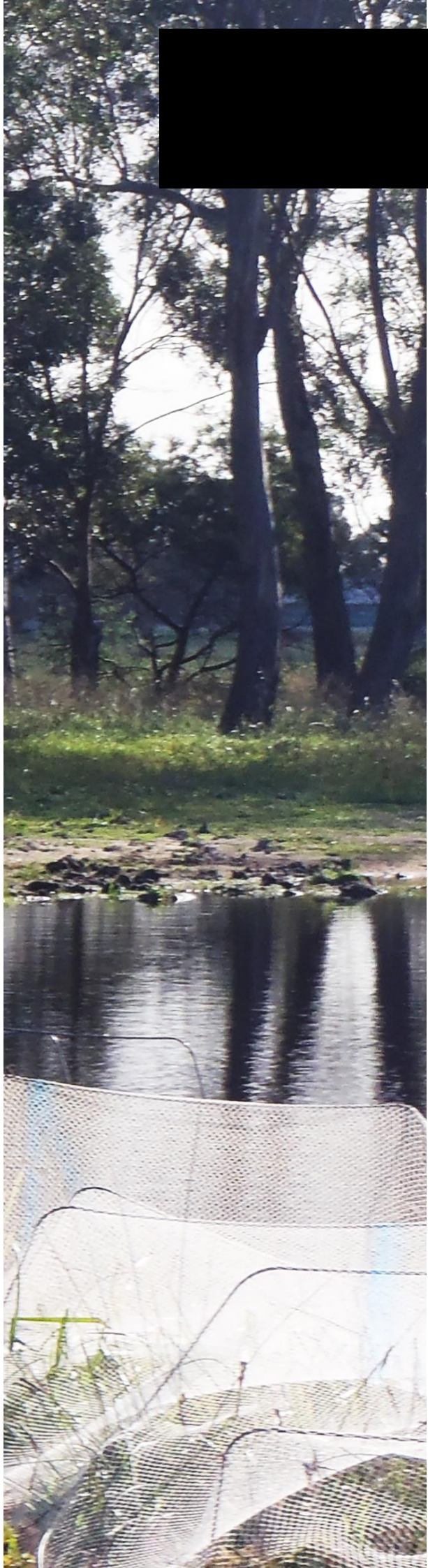
- Google Sketchup: 3d data was exported in order to be read into Google Sketchup allowing accurate and realistic to scale visualisations of the project.
- HECRAS: 3d data was exported to HECRAS in order to analyse preliminary flood depths along roadways and through floodway's.
- TUFLOW/MAPINFO: 3d data and drainage strings were exported to MapInfo for the development of a Tuflow model. Results from the Tuflow model were then imported back to 12d to set flood levels



4



** Animation available upon request



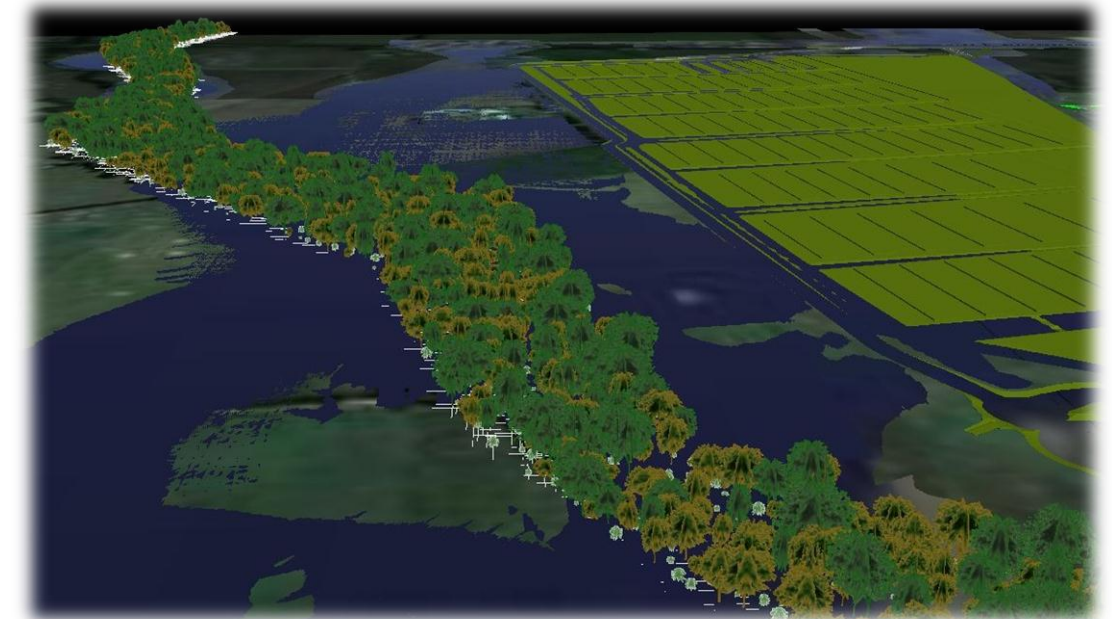
TUFLOW

Tuflow 5.1

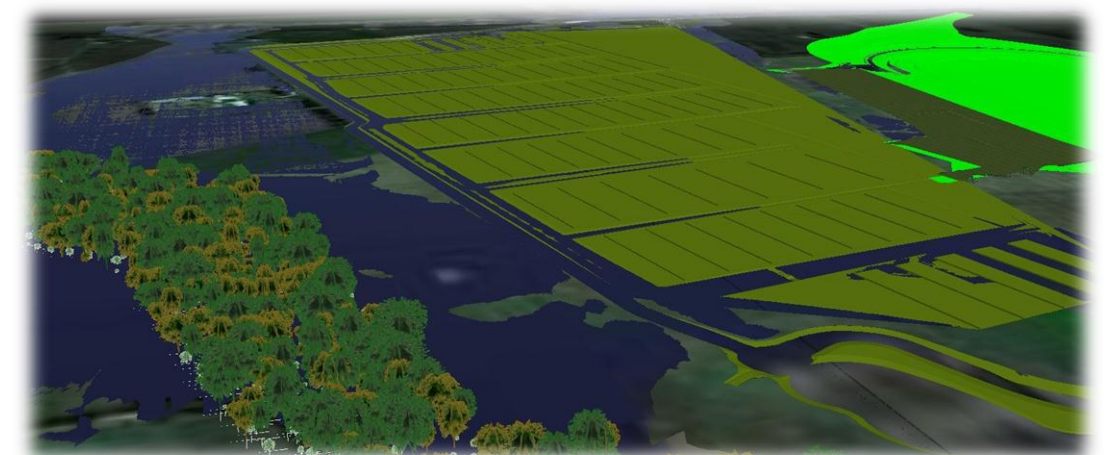
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5.1 TUFLOW

- The challenge was to provide flood visualisation over the site that the racing club could understand and use to show perspective purchasers of the trainer allotments.
- The challenge was overcome by using 12d in conjunction with TufLOW to produce flood animation over the site for the various storm events. Melbourne Water would also use these results to set minimum floor levels on each lot.
- The project included design in 12d of a 2km long swale to convey overland flows around the racecourse development.
- Outputs from 12d were exported to MapInfo for the development of a TufLOW flood model for the swale and wetlands.
- The TufLOW model's base geometry was composed of Tins exported directly from 12d.
- Results from TufLOW were imported to 12d as a tin to set 100 year ARI flood levels for the site.
- Piloting 12d Version 10, we used the TufLOW and TufLOW event visualisation options to check that the flood simulation occurred as expected



** Animation available upon request





VISUALISATIONS

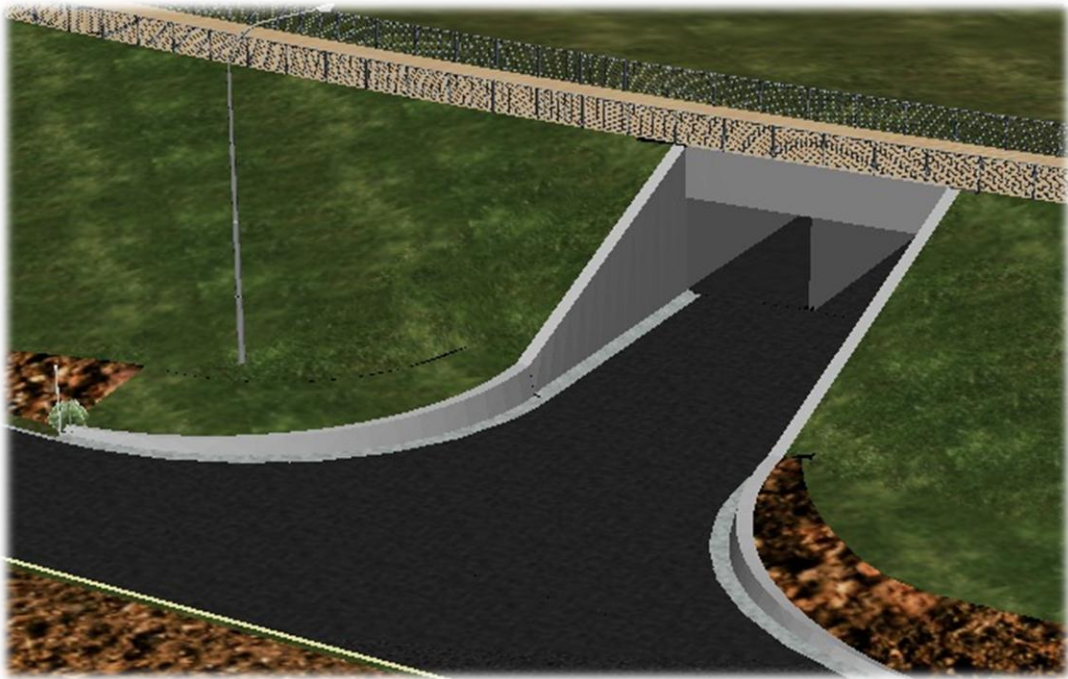
Main Entrance	6.1
Tunnel	6.2
Wetlands	6.3

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6.1 MAIN ENTRANCE



6.2 TUNNEL



6.3 WETLANDS

