



City of Karratha  
Dampier Stormwater Management Study  
Report  
Part B  
June 2015

## Appendix **C** – 2010 encroachment reviews



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**Rio Tinto Iron Ore**  
Report on Dampier Drainage  
Review  
Block 1 Encroachments  
June 2010



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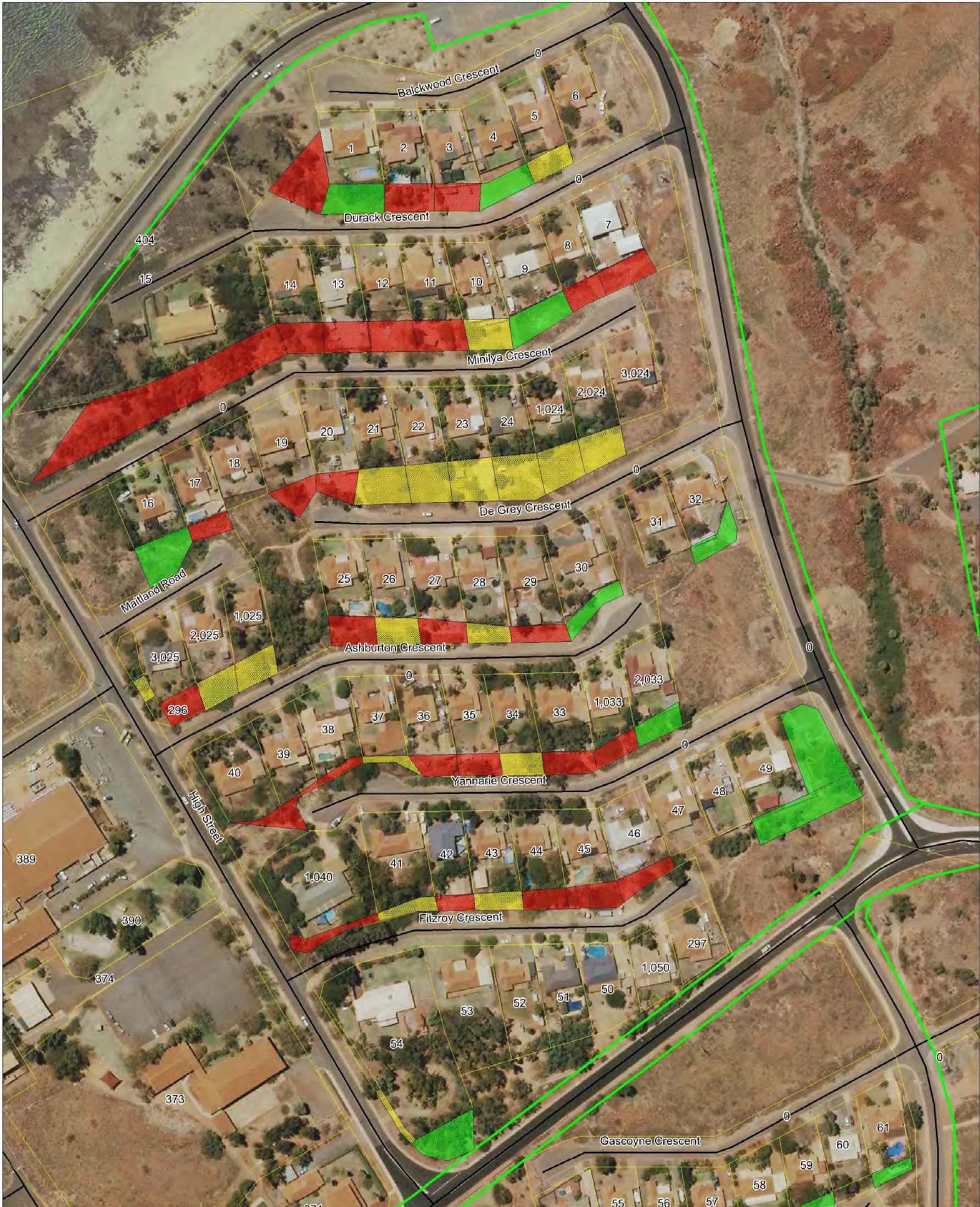
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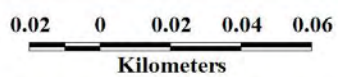


# 1. Block 1 Encroachments

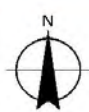


LEGEND

- Roads
- Cadastre
- Block Boundary
- Encroachment - Low
- Encroachment - Medium
- Encroachment - High



Map Projection: Universal Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia 1994  
Grid: Map Grid of Australia, Zone 50



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Client Name: RTIO  
Project Name: Dampier Drainage Assessment

## Block 1 Encroachments

Job Number | 6125224  
Revision | A  
Date | 17/08/2010

Figure 1

G:\DIR\JOB\DIR\WORKSPACE\NAME.WOR 239 Adelaide Terrace Perth WA 6004 Australia T 61 8 6222 8222 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au  
© 2010. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.  
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## 2. Durack Crescent (Blackwood Crescent lots)

This section refers to the street drainage along Durack Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Blackwood Crescent.

Durack Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into vacant reserve west of Durack Crescent.

The drainage reserve received and conveys flows from the rear half of the Blackwood Crescent lots. This discharges in a westerly direction into vacant reserve west of Durack Crescent.

## 2.1 West of Lot No. 1 Blackwood Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Pipeline Flowpath
<b>Description</b>	Dumped vegetation The water pipeline crosses the drainage reserve and significantly reduces the cross sectional capacity of the drain. Defined channel has been constructed but is blocked by vegetation (GHD has not conducted hydraulic modelling to determine if this is allowable)
<b>Photo ID</b>	
<b>Scope of Works</b>	H – Remove vegetation to clear channel blockage L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



## 2.2 Lot No. 1 Blackwood Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense vegetation Defined channel provides adequate flow path and drainage
<b>Photo ID</b>	366
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; dumped vegetation is to be removed.

### 2.3 Lot No. 2 Blackwood Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Boundary extension Vegetation Rocks
<b>Description</b>	Rear access with culvert Shed Semi – dense vegetation Large rocks impeding flow
<b>Photo ID</b>	41, 1016
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural channel invert of downstream lot (No. 1) L – Remove existing shed and relocate to within property boundary L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain M – Remove large rocks

## 2.4 Lot No. 3 Blackwood Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Modified topography; General items; Boundary extension.
<b>Description</b>	Rear access with culvert; Modified topography due to imported fill material to create a hardstand/ rear access; Sea container, trailer. Fence is within drainage reserve.
<b>Photo ID</b>	41
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural channel invert of downstream lot (No. 2). H – Remove fill material and reinstate drainage flow path as defined by the upstream and downstream capacity; L – Remove sea container and trailer; L - Remove existing fence and relocate to within the property boundary.

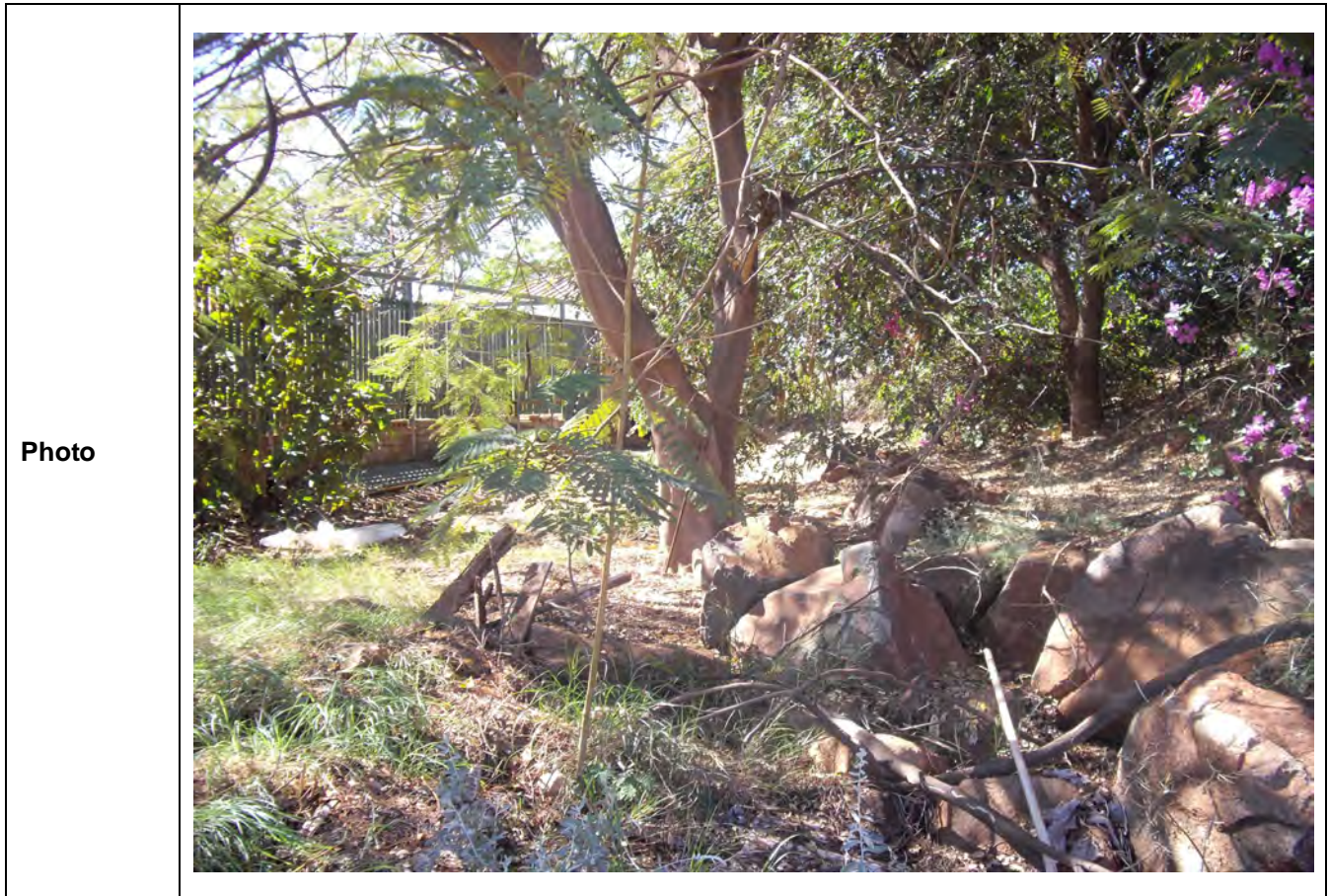


## 2.5 Lot No. 4 Blackwood Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Fill
<b>Description</b>	Semi - dense vegetation Blue metal and loose soil.
<b>Photo ID</b>	707
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; L – Remove stored blue metal and loose soil.

## 2.6 Lot No. 5 Blackwood Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Boundary extension; Vegetation; Flow path
<b>Description</b>	Building and landscaping encroachment from lot and extended road width encroaching from Crescent; Semi-dense vegetation; Flow path modified
<b>Photo ID</b>	1017
<b>Scope of Works</b>	M – Remove property extension and relocate to within property boundary – confirmation required from survey; Remove landscaping and extended road width. M – Move building back to property boundary. M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; M – Reinststate drainage flow path as defined by the natural channel invert of downstream lot (No. 4).



## 2.7 Lot No. 6 Blackwood Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	No defined flow path. Top of catchment and flow off reserve considered to be minor.
<b>Photo ID</b>	706
<b>Scope of Works</b>	None – flow path adequate.





### 3. Minilya Crescent (Durack Crescent lots)

This section refers to the street drainage along Minilya and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Durack Crescent.

Minilya Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Durack Crescent lots. This discharges in a westerly direction into vacant reserve west of Minilya Crescent.

### 3.1 Lot No. 7 Durack Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Side access driveway Rear access with culvert
<b>Description</b>	Side access driveway follows natural topography; Rear access impedes flow.
<b>Photo ID</b>	422 & 455
<b>Scope of Works</b>	Illegal side access noted – no works required H - Remove rear access and reinstate drainage flow path as defined by the natural channel invert of downstream channel.

### 3.2 Lot No. 8 Durack Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access with culvert
<b>Photo ID</b>	31
<b>Scope of Works</b>	H - Remove rear access and reinstate drainage flow path as defined by the natural channel invert of downstream channel.

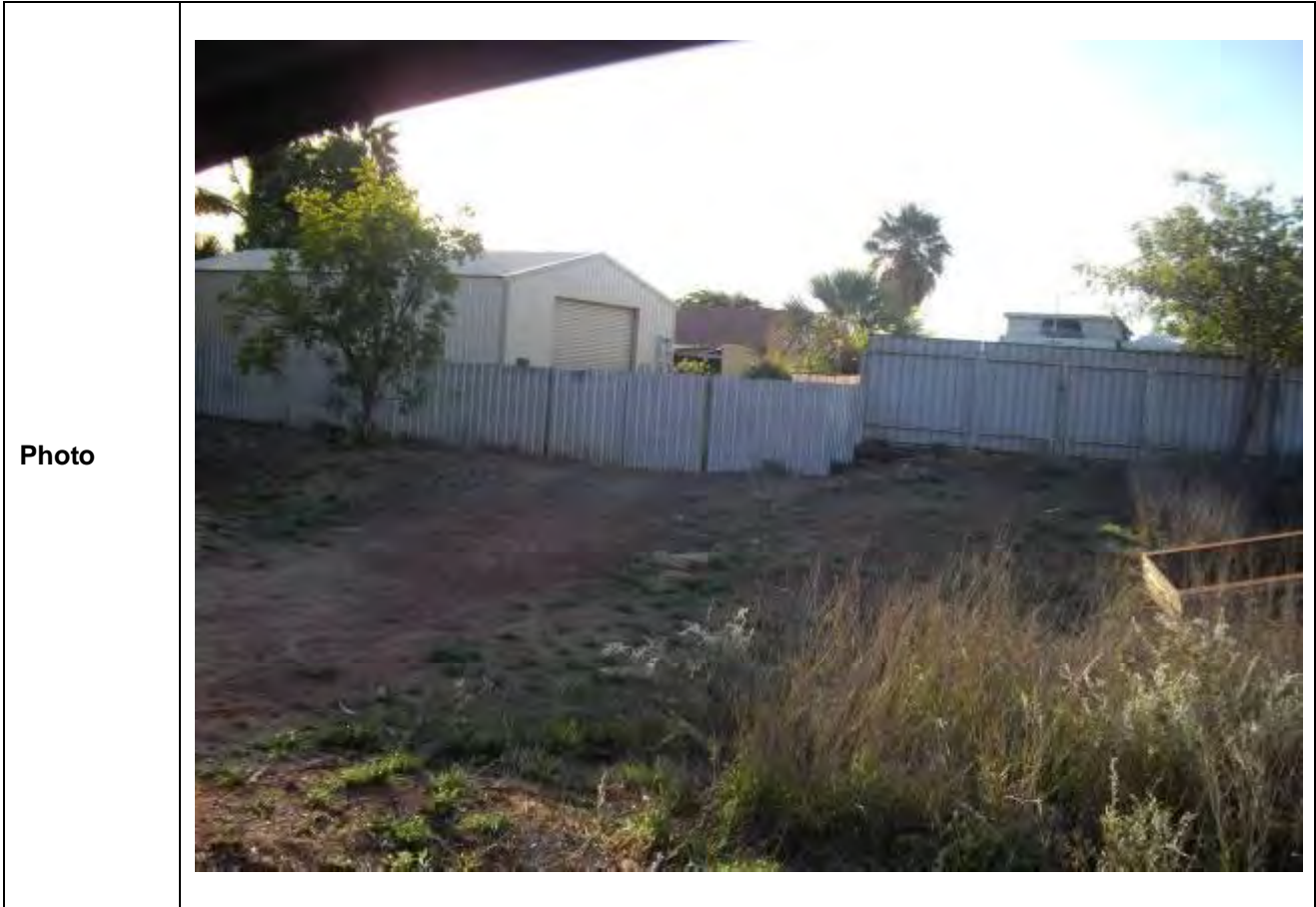
### 3.3 Lot No. 9 Durack Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Rear Access
<b>Description</b>	Unmaintained vegetation Rear access follows natural topography – flow path adequate
<b>Photo ID</b>	738
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



### 3.4 Lot No. 10 Durack Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Boundary encroachment
<b>Description</b>	Rear access follows natural topography and has minor impedence to flow Fence and shed are within the drainage reserve
<b>Photo ID</b>	676
<b>Scope of Works</b>	M - Remove rear access driveway and reinstate drainage flow path as defined by the natural channel invert of downstream channel. L – Remove fence and relocate to within property boundary. Remove shed and relocate to within property boundary – confirmation required from survey.

### 3.5 Lot No. 11 Durack Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Boundary extension
<b>Description</b>	Rear access with Inadequate culvert due to invert level to high; Shed.
<b>Photo ID</b>	1029, 452
<b>Scope of Works</b>	H - Remove rear access.and reinstate drainage flow path as defined by the natural channel invert of downstream channel; L - Remove shed.



### 3.6 Lot No. 12 Durack Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension; General items; Rear access
<b>Description</b>	Shed; Trailers; Rocks not but no impact on flow. Rear access plus modified topography impedes flow from Lot 11
<b>Photo ID</b>	1030, 453
<b>Scope of Works</b>	L – Remove shed; L – Remove trailer; H - Remove rear access and reinstate drainage flow path as defined by the natural channel invert of downstream channel

### 3.7 Lot No. 13 Durack Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary Extension Rear access
<b>Description</b>	Fenced area within drainage reserve. Rear access and modified topography impedes flow from Lot 12.
<b>Photo ID</b>	454
<b>Scope of Works</b>	H - Remove and relocate fenced off area and reinstate property boundary H - Remove rear access and reinstate drainage flow path as defined by the natural channel invert of downstream channel

### 3.8 Lot No. 14 Durack Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Shallow and wide drain section with dense vegetation impeding flow
<b>Photo ID</b>	739
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



### 3.9 Lot No. 15 Durack Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Dense vegetation. General silting and fill required cleaning out.
<b>Photo ID</b>	740
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain, clean out silted area.



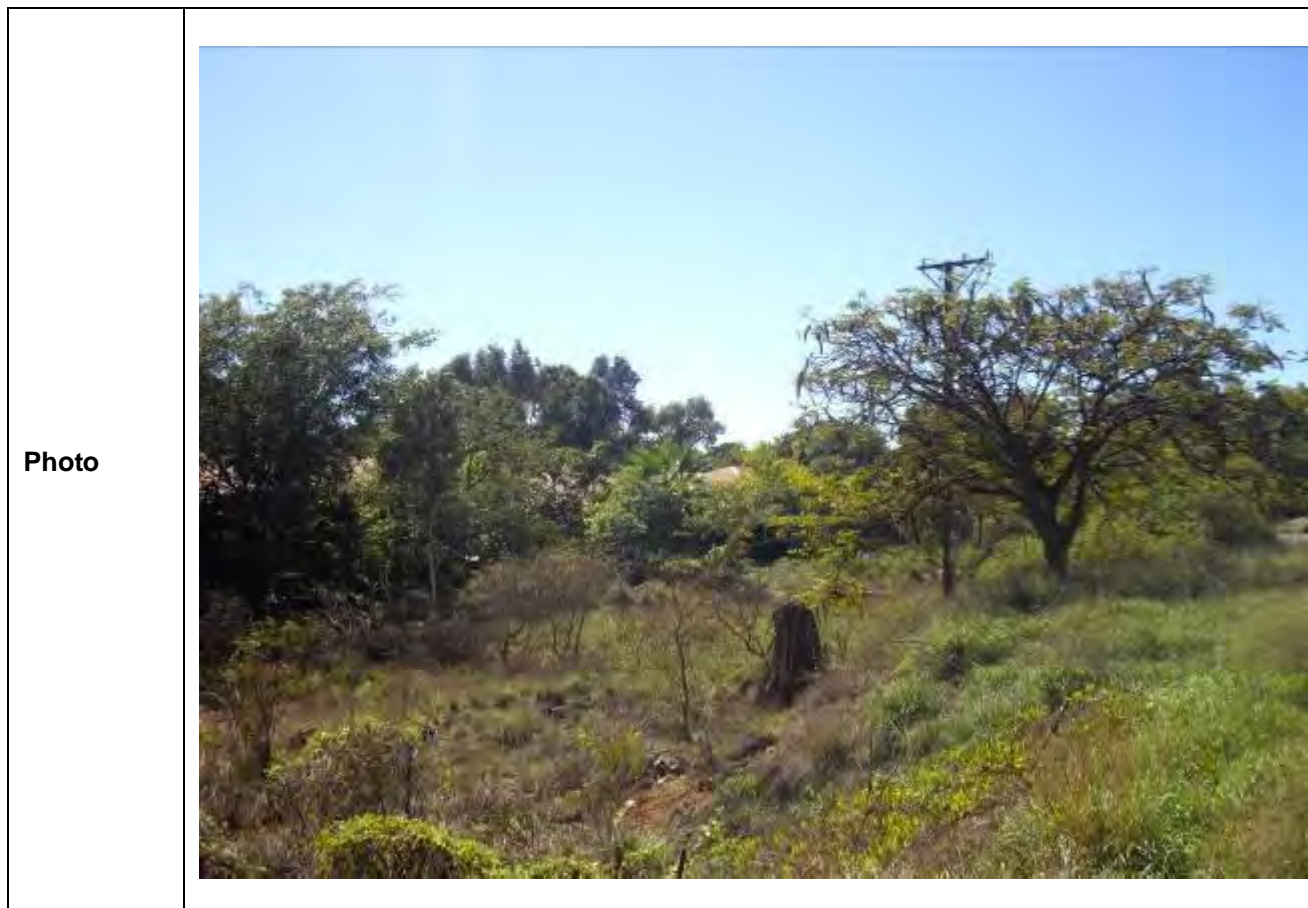
## 4. Maitland Road (Minilya Crescent lots)

This section refers to the street drainage along Maitland Road and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Minilya Crescent.

Maitland Crescent receives and conveys flow from the front half of its upstream lots. This discharges in an easterly direction to the drainage reserve between De Grey and Maitland Crescents.

The drainage reserve received and conveys flows from the rear half of the Minilya Crescent lots. This discharges in a westerly direction into vacant reserve west of Minilya Crescent lots.

#### 4.1 Lot No. 16 Minilya Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Good drainage reach with wide channel
<b>Photo ID</b>	737
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



#### 4.2 Lot No. 17 Minilya Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow Path Vegetation
<b>Description</b>	Raised channel plus vegetation and rubble impede flow
<b>Photo ID</b>	371
<b>Scope of Works</b>	H – Location requires construction of reinstated drainage flow path as defined by the natural channel invert of downstream channel.



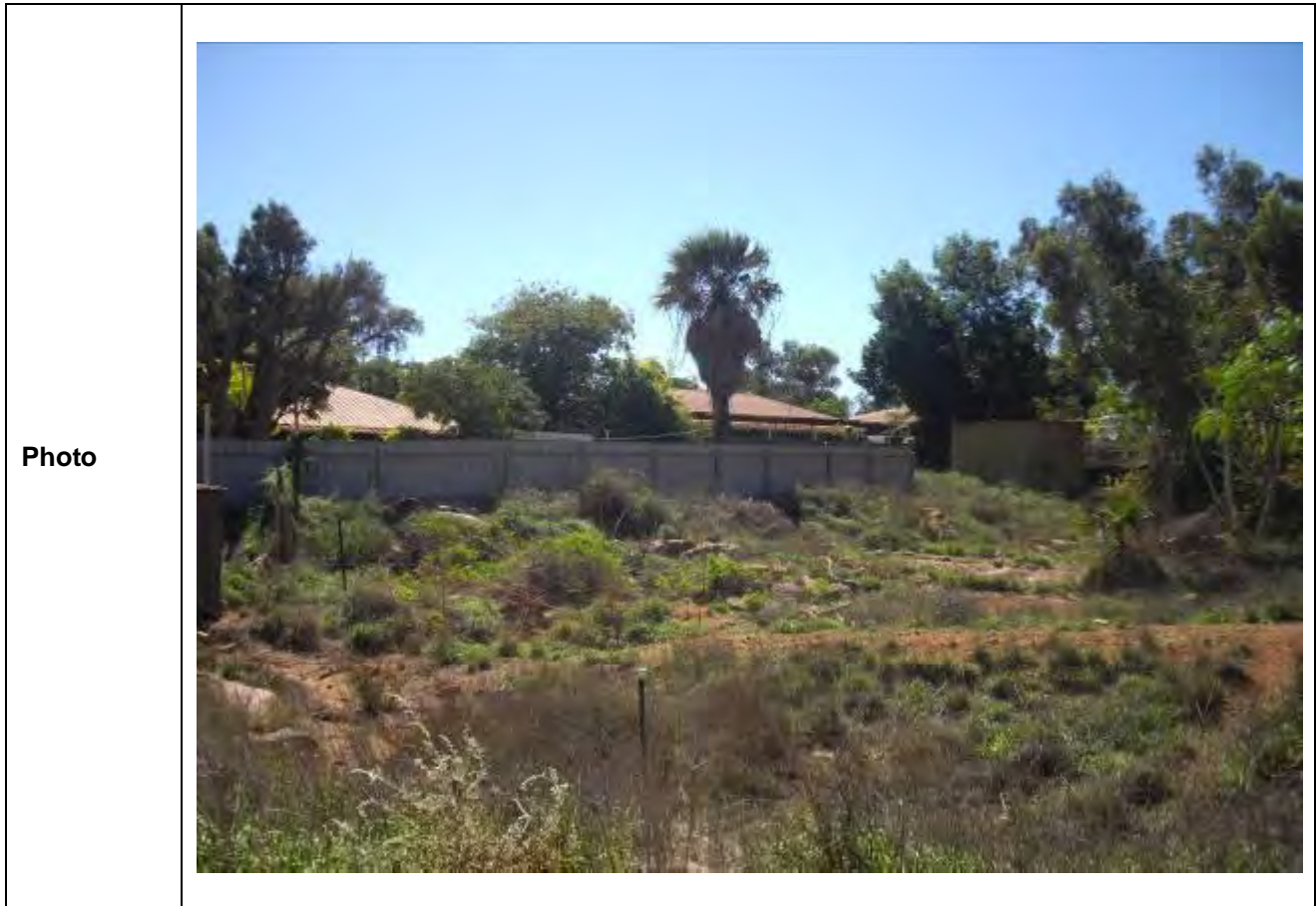
## 5. De Grey Crescent (Minilya Crescent lots)

This section refers to the street drainage along De Grey Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Minilya Crescent.

Maitland Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction to the drainage reserve between De Grey and Maitland Crescents.

The drainage reserve received and conveys flows from the rear half of the Minilya Crescent lots. This discharges in a westerly direction into vacant reserve west of Minilya Crescent lots.

### 5.1 Lot No. 18 Minilya Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None
<b>Photo ID</b>	736
<b>Scope of Works</b>	None required



## 5.2 Lot No. 19 Minilya Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow.
<b>Photo ID</b>	39
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural channel invert of downstream channel.

### 5.3 Lot No. 20 Minilya Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension; General item; Rear access;
<b>Description</b>	Fence and landscaping; Caravan; Rear access with culvert follows modified topography; Highly modified drainage reserve due to fill.
<b>Photo ID</b>	674
<b>Scope of Works</b>	H – Remove existing fence and landscaping relocate to within property boundary; H – Remove rear access reinstate drainage flow path as defined by the natural channel invert of downstream channel.

#### 5.4 Lot No. 21 Minilya Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Semi-dense vegetation
<b>Photo ID</b>	1023, 711
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

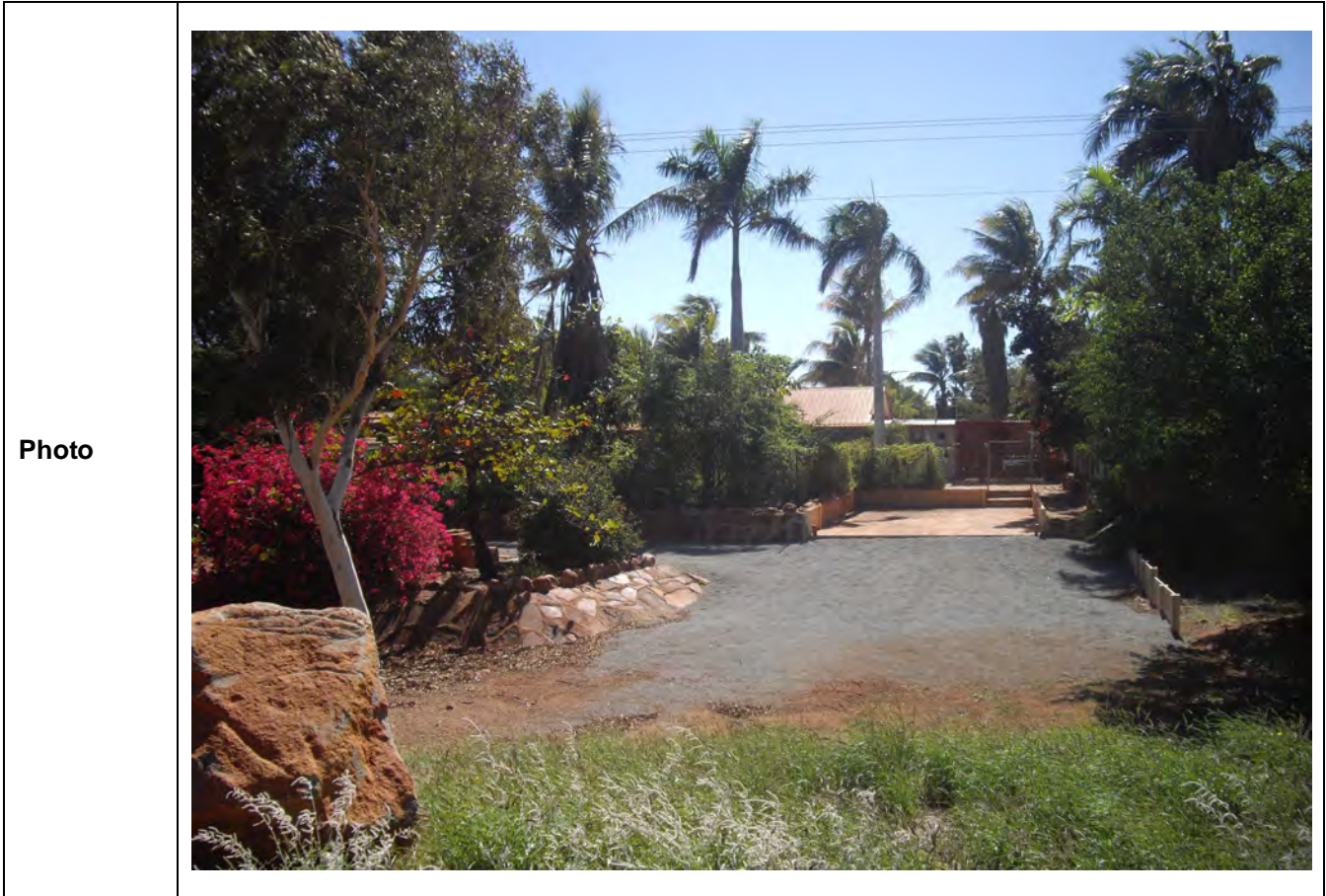


## 5.5 Lot No. 22 Minilya Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Vegetation; Rear access and culvert crossing.
<b>Description</b>	Semi-dense vegetation Rear access with culvert crossing
<b>Photo ID</b>	37
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; M – Remove culvert crossing and reinstate drainage flow path as defined by the natural channel invert of downstream channel.

## 5.6 Lot No. 23 Minilya Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Boundary encroachment.
<b>Description</b>	Rear acces follows natural topography; Extensive landscaping including retaining walls and gardens – does not impede flow.
<b>Photo ID</b>	1019, 38
<b>Scope of Works</b>	M – Remove rear access; M – Remove landscaping.





### 5.7 Lot No. 24 Minilya Crescent

<b>Lot No.</b>	24
<b>Road (Viewed from)</b>	De Grey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography
<b>Photo ID</b>	426
<b>Scope of Works</b>	M - Remove rear access and reinstate drain



## 5.8 Lot No. 1,024 Minilya Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Vegetation
<b>Description</b>	Dumped vegetation within the drainage reserve.
<b>Photo ID</b>	710
<b>Scope of Works</b>	M – Remove dumped vegetation.

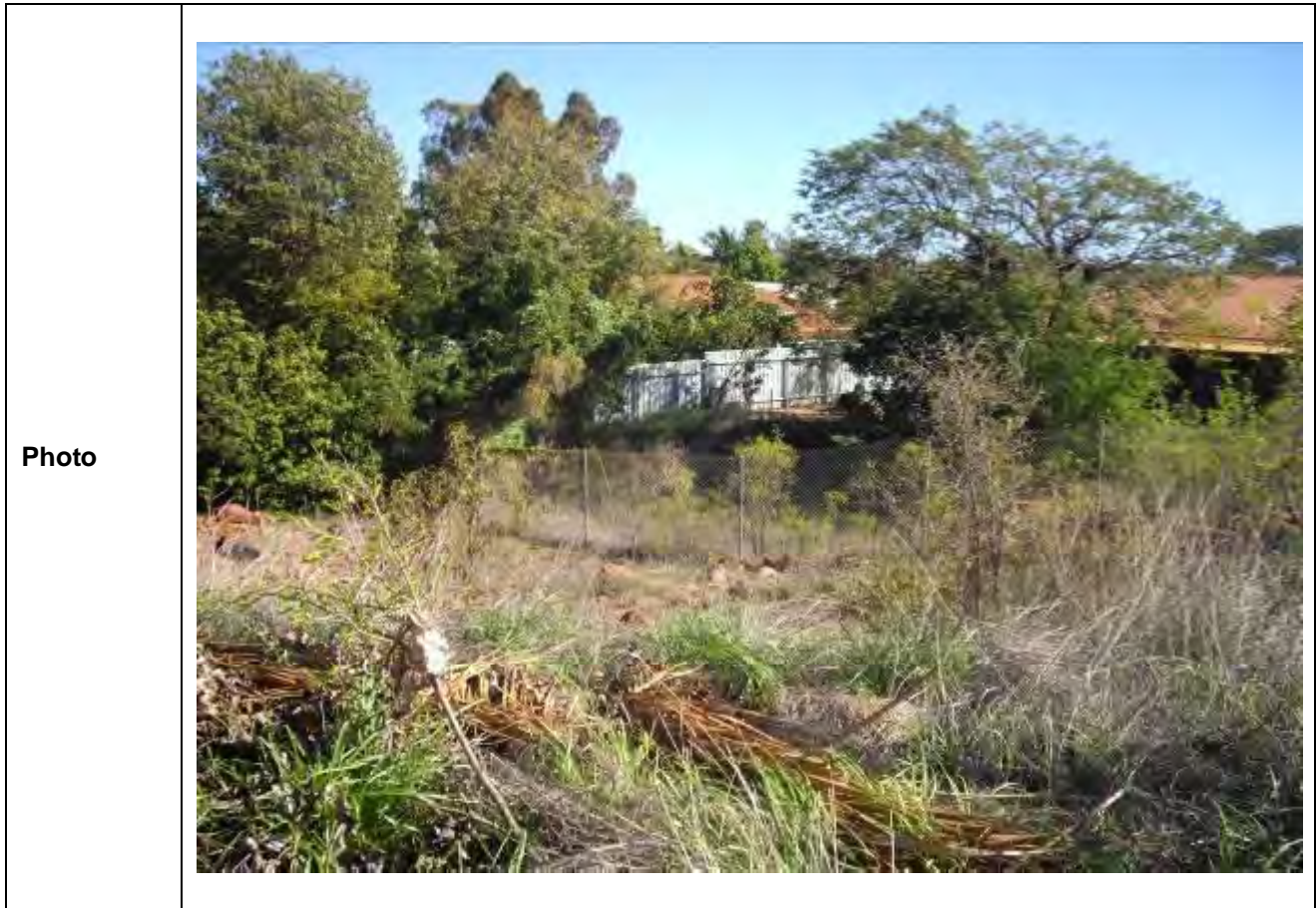
## 5.9 Lot No. 2,024 Minilya Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Modified topography Rocks
<b>Description</b>	Reduced cross sectional area due to fill; Large rocks near power pole impeding flow.
<b>Photo ID</b>	709
<b>Scope of Works</b>	M – Remove fill; M – Remove rocks near power pole.



### 5.10 Lot No. 3,024 Minilya Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Top of catchment – natural channel adequately conveys flow downstream
<b>Photo ID</b>	708
<b>Scope of Works</b>	None





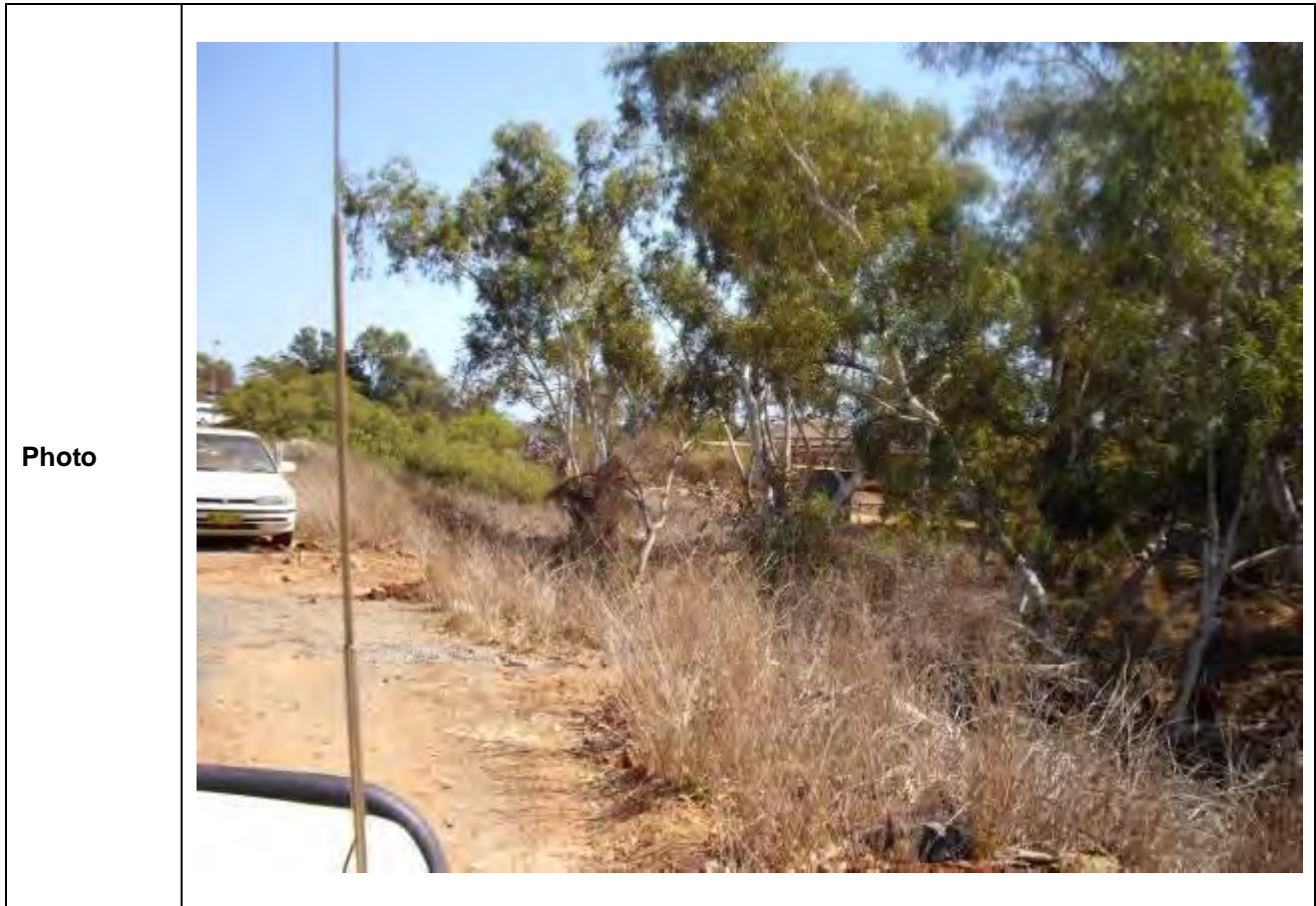
## 6. Ashburton Crescent (Maitland Road and De Grey Crescent lots)

This section refers to the street drainage along Ashburton Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Maitland Road and De Grey Crescent.

Ashburton Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Maitland Road and De Grey Crescent lots. This discharges to the drainage reserve between the two afore mention roads.

## 6.1 Lot No. 1,025 Maitland Road



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Large trees and dense vegetation within drainage reserve.
<b>Photo ID</b>	374
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

## 6.2 Lot No. 2,025 Maitland Road



<b>Category</b>	Drain Maintenance
<b>Type</b>	Undefined drain, Vegetation
<b>Description</b>	Vegetation and undefined drain impeding overland flow.
<b>Photo ID</b>	735
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



### 6.3 Lot No. 3,025 Maitland Road



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension; Vegetation; Side access.
<b>Description</b>	Fence; Unmaintained vegetation at top catchment; Side access in form of walk bridge over drain.
<b>Photo ID</b>	434 & 435
<b>Scope of Works</b>	H - Remove fence and relocate to within property boundary – confirmation required from survey. boundary; H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain. M – Remove side access

#### 6.4 Lot No. 25 De Grey Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Dense vegetation impeding flow.
<b>Photo ID</b>	372
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

## 6.5 Lot No. 26 De Grey Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Natural flow path requires maintenance.
<b>Photo ID</b>	734
<b>Scope of Works</b>	M – Slash vegetation and reinstate drainage flow path as defined by the natural channel invert of downstream channel



## 6.6 Lot No. 27 De Grey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access.
<b>Description</b>	Rear access follows modified topography and impedes flow.
<b>Photo ID</b>	433
<b>Scope of Works</b>	H – Remove rear access reinstate drainage flow path as defined by the natural channel invert of downstream channel

## 6.7 Lot No. 28 De Grey Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Natural flow path requires maintenance.
<b>Photo ID</b>	733
<b>Scope of Works</b>	M – Slash vegetation and reinstate drainage flow path as defined by the natural channel invert of downstream channel

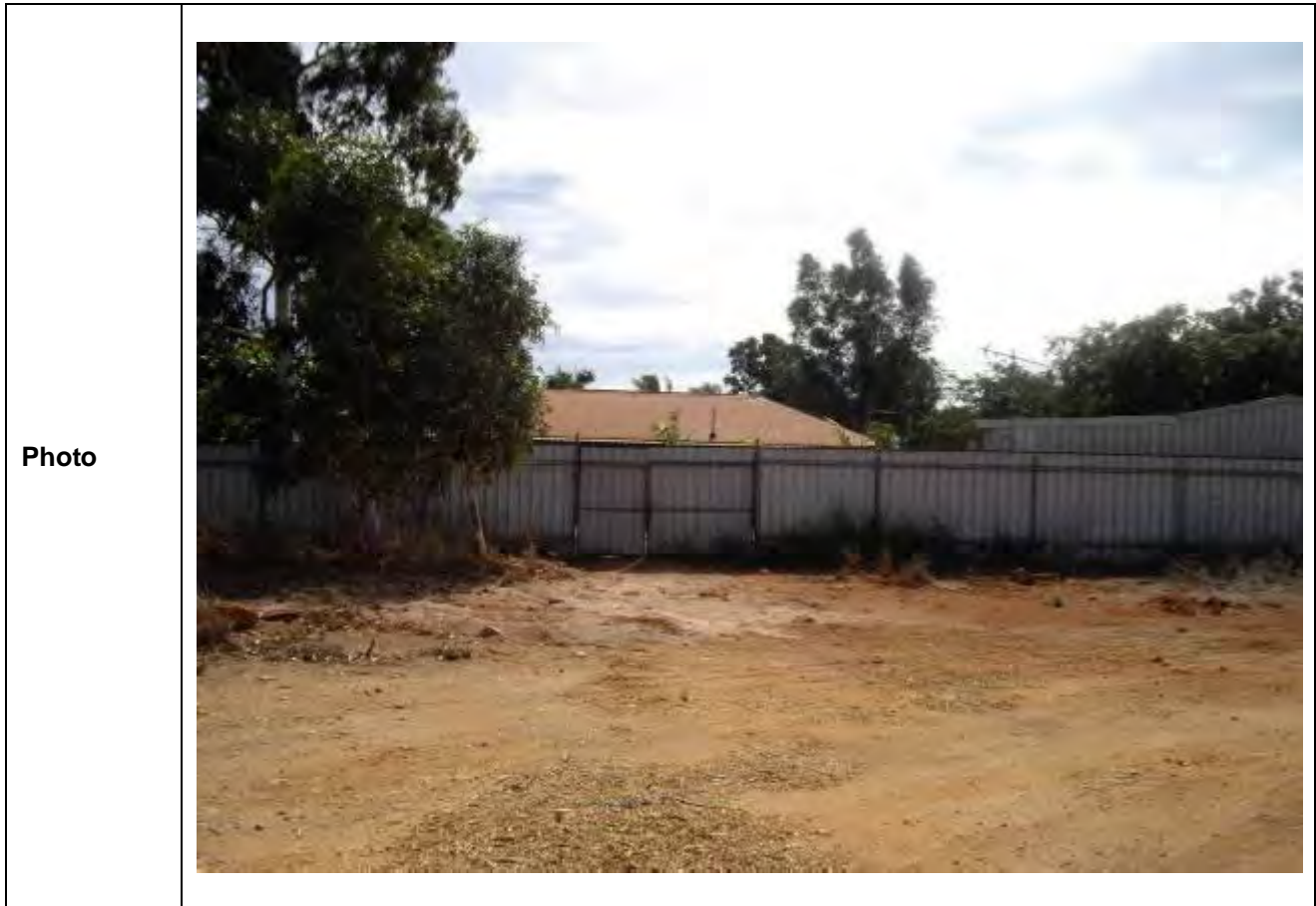
## 6.8 Lot No. 29 De Grey Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access Flow path
<b>Description</b>	Rear access follows modified topography Ill defined flow path due to the modification of the drainage reserve..
<b>Photo ID</b>	432
<b>Scope of Works</b>	H - Remove rear access and reinstate drainage flow path as defined by the natural channel invert of downstream channel (lot 28); H – Design and construction of drainage flow path required.



## 6.9 Lot No. 30 De Grey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Flow path
<b>Description</b>	Rear access follow modified topography Ill defined flow path due to the modification of the drainage reserve. Top of catchment
<b>Photo ID</b>	431
<b>Scope of Works</b>	L – Remove rear access (no other works required)

## 6.10 Lot No. 31 De Grey Crescent



<b>Category</b>	None
<b>Type</b>	Flow path
<b>Description</b>	Natural topography directs stormwater to the road reserve and the drainage reserve. No evidence of modification.
<b>Photo ID</b>	730 – photo of property with green shed.
<b>Scope of Works</b>	None required

## 6.11 Lot No. 32 De Grey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Flow path
<b>Description</b>	'Donga' located within drainage reserve Natural topography directs stormwater to the road reserve and the drainage reserve. No evidence of modification.
<b>Photo ID</b>	731 – photo of property with 'donga'
<b>Scope of Works</b>	L – Remove 'Donga' and relocate to within property boundary.





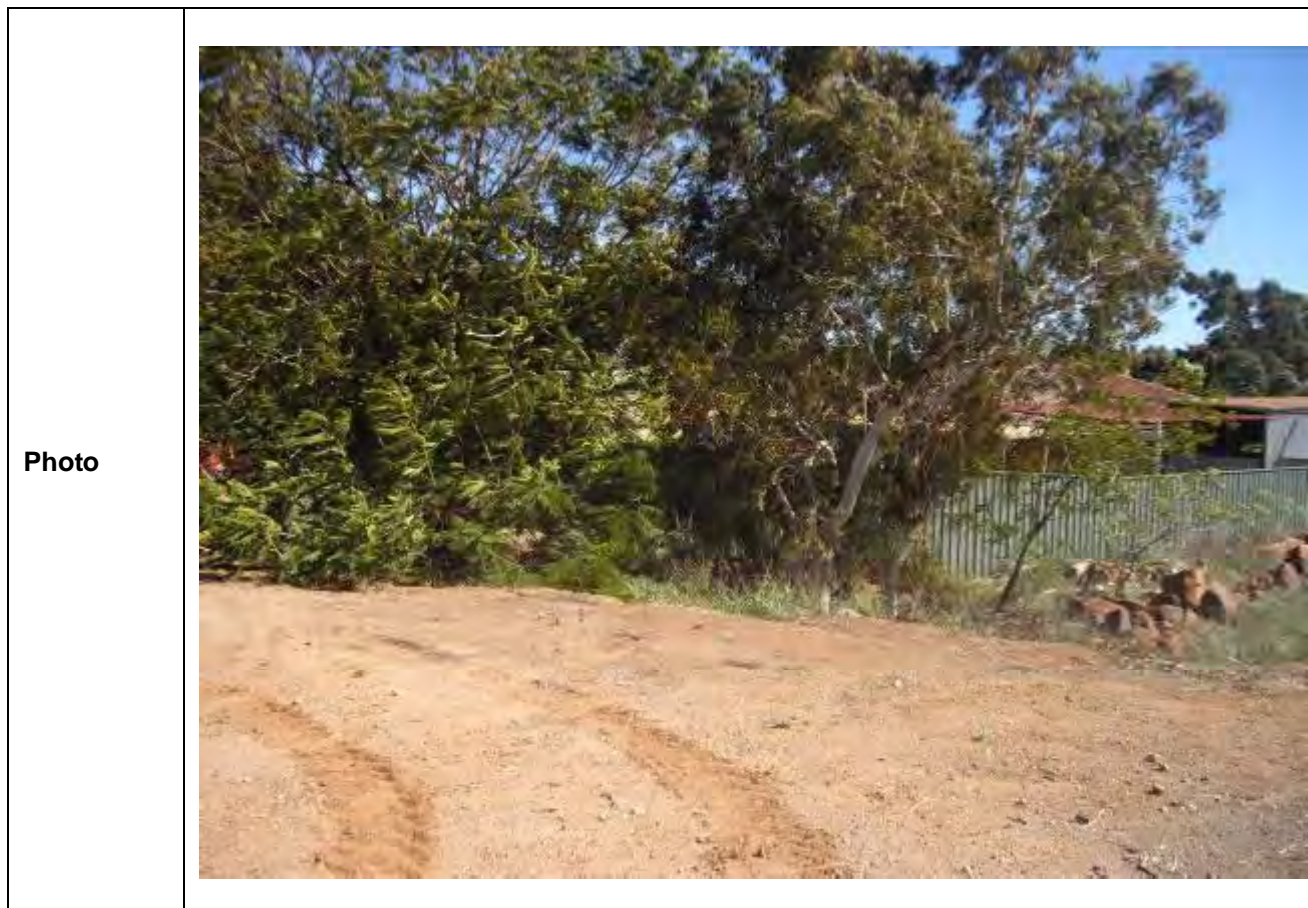
## 7. Yannarie Crescent (Ashburton Crescent lots)

This section refers to the street drainage along Yannarie Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Ashburton Crescent.

Yannarie Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Ashburton Crescent lots. This discharges in a westerly direction.

## 7.1 Lot No. 2,033 Ashburton Crescent



<b>Category</b>	Drain Maintenance/ Encroachment
<b>Type</b>	Vegetation; Ill defined flow path; Boundary extension.
<b>Description</b>	Dense vegetation impeding flow; Top of catchment - flow path adequate Fence is within drainage reserve at south-eastern corner – see aerial
<b>Photo ID</b>	712
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; L – Remove existing fence and relocate to within property boundary.

## 7.2 Lot No. 1,033 Ashburton Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Thick low lying vegetation;
<b>Photo ID</b>	713
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



### 7.3 Lot No. 33 Ashburton Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access; Vegetation;
<b>Description</b>	Rear access and modified topography. Trees and semi-dense vegetation;
<b>Photo ID</b>	714
<b>Scope of Works</b>	H - Remove rear access and reinstate drainage flow path as defined by the natural channel invert of downstream channel; L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

#### 7.4 Lot No. 34 Ashburton Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path; Culvert entry Vegetation.
<b>Description</b>	Flow path low point is within the property boundary Un-engineered culvert entry point from road reserve, potential flooding hazard to property.
<b>Photo ID</b>	1025, 715
<b>Scope of Works</b>	M - Reinstate drainage flow path as defined by the natural channel invert of downstream channel; M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



## 7.5 Lot No. 35 Ashburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items; Flow path
<b>Description</b>	Rubbish; Drainage flow path low point is not contained within drainage reserve.
<b>Photo ID</b>	1026
<b>Scope of Works</b>	H - Remove rubbish; H - Reinststate drainage flow path within reserve as defined by the natural channel invert of downstream channel.



## 7.6 Lot No. 36 Ashburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items Flow path
<b>Description</b>	Mostly rubbish; Drainage flow path low point is within the property boundary.
<b>Photo ID</b>	1027, 444
<b>Scope of Works</b>	L - Remove rubbish; H - Reinststate drainage flow path within reserve as defined by the natural channel invert of downstream channel.

## 7.7 Lot No. 37 Ashburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items; Vegetation
<b>Description</b>	Rubbish Dense vegetation impedes flow
<b>Photo ID</b>	445
<b>Scope of Works</b>	L - Remove general rubbish; M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

## 7.8 Lot No. 38 Ashburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Flow path.
<b>Description</b>	Boundary fence is close to the road reserve; No flow path within small drainage reserve for major flow.
<b>Photo ID</b>	446
<b>Scope of Works</b>	L – Remove fence and relocate to within property boundary. H - Reinststate drainage flow path within reserve as defined by the natural channel invert of downstream channel



**7.9 Lot No. 39 Ashburton Crescent**



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Flow towards lots..
<b>Photo ID</b>	447
<b>Scope of Works</b>	H - Reinststate drainage flow path within reserve as defined by the natural channel invert of downstream channel

### 7.10 Lot No. 40 Ashburton Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Flow towards lots, boundary close to road.
<b>Photo ID</b>	448
<b>Scope of Works</b>	H - Reinststate drainage flow path within reserve as defined by the natural channel invert of downstream channel



## 8. Fitzroy Crescent (Yannarie Crescent lots)

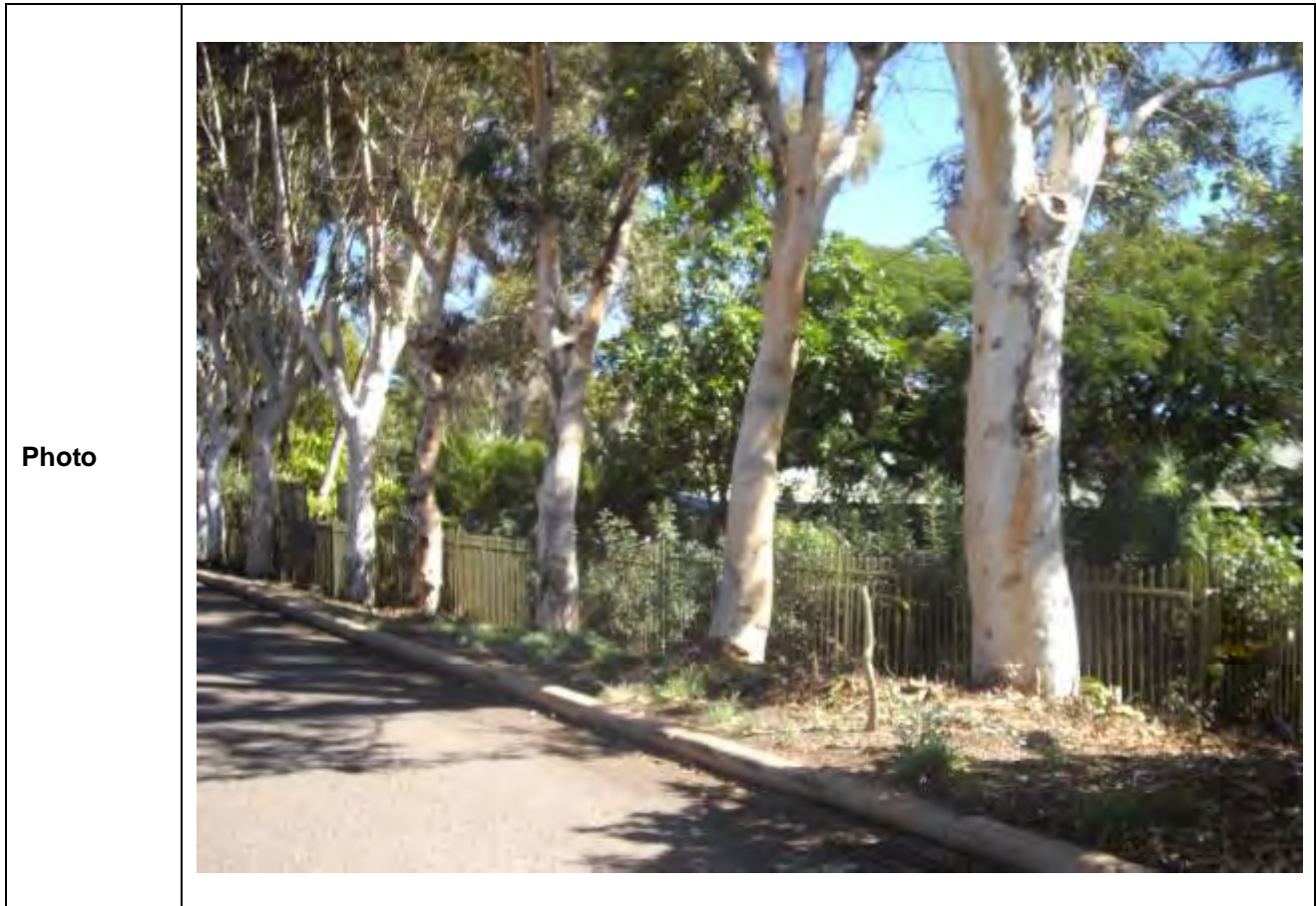
This section refers to the street drainage along Fitzroy Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Yannarie Crescent.

Fitzroy Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Yannarie Crescent lots. This discharges in a westerly direction, however there are issues with the drainage behind lots 37 – 40 of Yannarie Crescent. This section needs to be addressed separately outside of this project.



## 8.1 Lot No. 1,040 Yannarie Crescent



<b>Category</b>	Drain Maintenance/ Encroachment
<b>Type</b>	Flow path; Boundary encroachment
<b>Description</b>	Kerb and channel on both sides of road. No flow path within drainage reserve, road conveys stormwater from upslope lots Possible boundary encroachment from fence
<b>Photo ID</b>	729
<b>Scope of Works</b>	H - Remove existing fence and relocate to within property boundary – get confirmation from survey

## 8.2 Lot No. 41 Yannarie Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path Vegetation
<b>Description</b>	No East to West flow path within drainage reserve as road conveys runoff. Semi dense vegetation
<b>Photo ID</b>	728
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



### 8.3 Lot No. 42 Yannarie Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access with culvert
<b>Description</b>	Rear access follows natural topography. Reconstructed channel is adequate
<b>Photo ID</b>	440
<b>Scope of Works</b>	H - Remove rear access.



#### 8.4 Lot No. 43 Yannarie Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Modified drain; Vegetation
<b>Description</b>	Drain blocked with imported fill Vegetation impeding flow
<b>Photo ID</b>	439
<b>Scope of Works</b>	M - Remove fill and reinstate drainage flow path as defined by the natural channel invert of downstream channel M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

## 8.5 Lot No. 44 Yannarie Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Boundary extension; Vegetation Flow Path
<b>Description</b>	Fence; Semi-dense vegetation; Unengineered culvert entry point that may encroach on property.
<b>Photo ID</b>	1028, 438
<b>Scope of Works</b>	L – Remove fence and relocate to within the property boundary; M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; H - Reinststate drainage flow path within reserve as defined by the natural channel invert of downstream channel



### 8.6 Lot No. 45 Yannarie Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow Path Vegetation
<b>Description</b>	No identified flow path Semi dense vegetation
<b>Rank</b>	-
<b>Photo ID</b>	727
<b>Scope of Works</b>	H - Reinststate drainage flow path as defined by the natural channel invert of downstream channel M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



**8.7 Lot No. 46 Yannarie Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Rocks, Property gardens extend right up to road
<b>Photo ID</b>	436
<b>Scope of Works</b>	H - Remove rocks and reinstate drainage flow path as defined by the natural channel invert of downstream channel

### 8.8 Lot No. 47 Yannarie Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Top of catchment
<b>Photo ID</b>	726
<b>Scope of Works</b>	None

### 8.9 Lot No. 48 Yannarie Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Top of catchment
<b>Photo ID</b>	723
<b>Scope of Works</b>	None



### 8.10 Lot No. 49 Yannarie Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Potential extension of fence outside of property boundary
<b>Photo ID</b>	449
<b>Scope of Works</b>	L - Get confirmation from survey. Remove extension back to property boundary



## 9. Dampier Road (Fitzroy Crescent lots)

This section refers to the street drainage along Fitzroy Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Yannerie Crescent.



### 9.1 Lot No. 297 Fitzroy Crescent

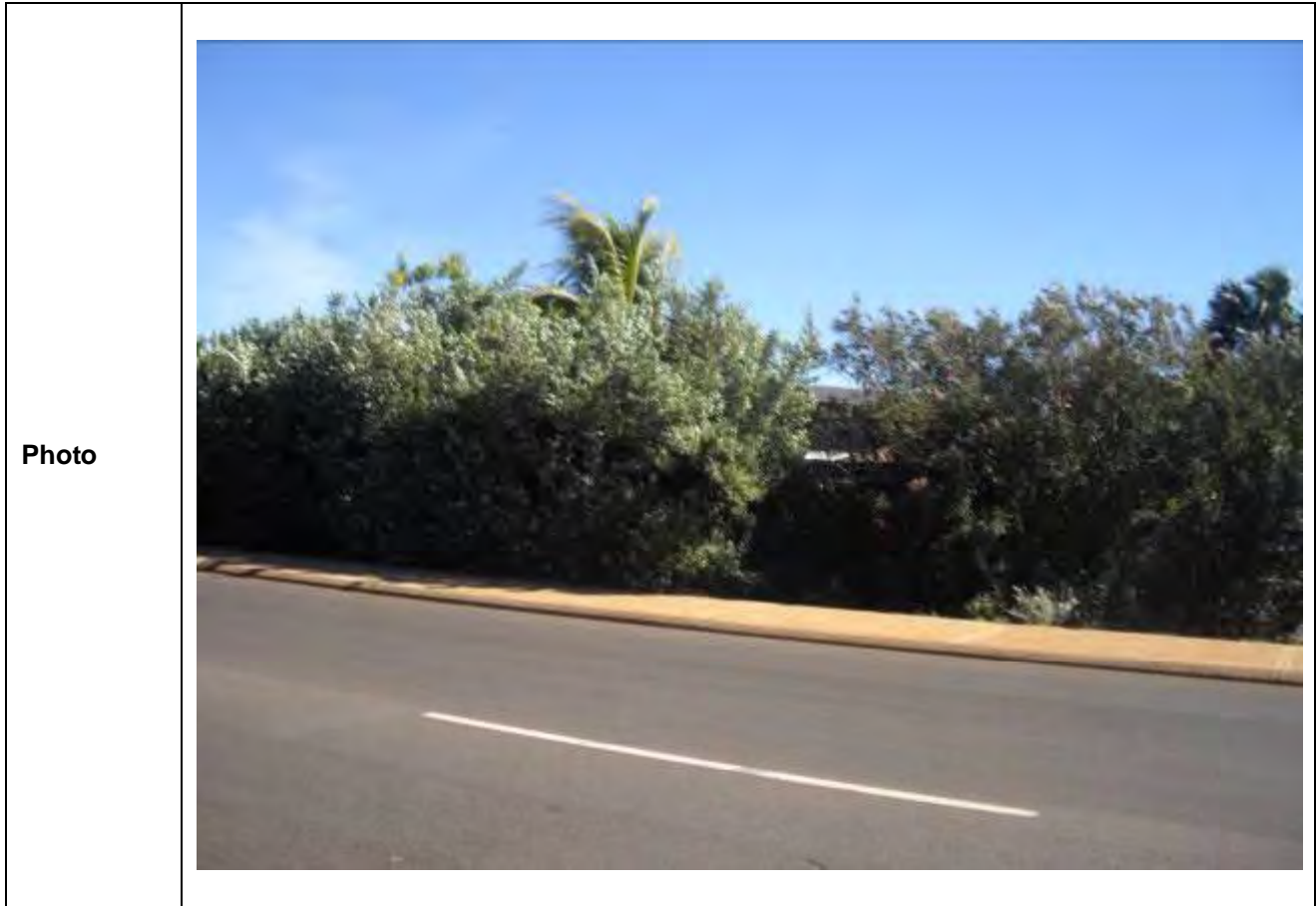


<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None
<b>Photo ID</b>	716
<b>Scope of Works</b>	None required





## 9.2 Lot No. 1,050 Fitzroy Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None
<b>Photo ID</b>	717
<b>Scope of Works</b>	None

**9.3 Lot No. 50 Fitzroy Crescent**



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Flow path towards lots. Road reserve to function as flow path
<b>Photo ID</b>	719
<b>Scope of Works</b>	None

#### 9.4 Lot No. 51 Fitzroy Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Flow path towards lots. Road reserve functions as flow path.
<b>Photo ID</b>	720
<b>Scope of Works</b>	None required



## 9.5 Lot No. 52 Fitzroy Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Flow path towards lots. Road reserve functions as flow path.
<b>Photo ID</b>	721
<b>Scope of Works</b>	None required

## 9.6 Lot No. 53 Fitzroy Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Flow path towards lots. Road reserve functions as flow path.
<b>Photo ID</b>	722
<b>Scope of Works</b>	None required

**9.7 Lot No. 54 Fitzroy Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension, Side access with culverts
<b>Description</b>	Extended landscaping, Side access with culverts on western boundary.
<b>Photo ID</b>	451
<b>Scope of Works</b>	L - Illegal activity - remove existing landscaping up to edge of property boundary; M - Remove side access driveway and reinstate drainage defined by the natural channel





CLIENTS | PEOPLE | PERFORMANCE

**Rio Tinto Iron Ore**  
Report on Dampier Drainage  
Review  
Block 2 Encroachments  
June 2010



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# 1. Block 2 Encroachments



LEGEND

- Roads
- Cadastre
- Block Boundary
- Encroachment - Low
- Encroachment - Medium
- Encroachment - High



Map Projection: Universal Transverse Mercator  
 Horizontal Datum: Geocentric Datum of Australia 1994  
 Grid: Map Grid of Australia, Zone 50



CLIENTS | PEOPLE | PERFORMANCE



Client Name: RTIO  
 Project Name: Dampier Drainage Assessment

## Block 2 Encroachments

Job Number | 6125224  
 Revision | A  
 Date | 17/08/2010

Figure 1

G:\DIR\JOB\DIR\WORKSPACE\NAME.WOR © 2010. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason. Data source: Data Custodian, Data Set Name/Title, Version/Date. Created by: 239 Adelaide Terrace Perth WA 6004 Australia T 61 8 6222 8222 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au







## 2. Portland Crescent (Pinderi Crescent lots)

This section refers to the street drainage along Portland Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Pinderi Crescent.

Portland Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hospital drive.

The drainage reserve received and conveys flows from the rear half of the Pinderi Crescent lots. This discharges in a westerly direction to rocky open space.



## 2.1 Open space – Pinderi Crescent

<p>Photo</p>	
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<b>Category</b>	Drain Maintenance
<b>Type</b>	Undefined reserve
<b>Description</b>	Drains to open space
<b>Photo ID</b>	741
<b>Scope of Works</b>	None required

## 2.2 Lot No. 299 Pinderi Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography with minimal impact on flow.
<b>Photo ID</b>	677
<b>Scope of Works</b>	L - Remove access driveway and reinstate drainage flow path as defined by the natural channel invert of downstream lot.

### 2.3 Lot No. 300 Pinderi Crescent

<b>Photo</b>	
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<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Trees and low lying vegetation;
<b>Photo ID</b>	462
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



## 2.4 Lot No. 301 Pinderi Crescent

<b>Photo</b>	
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<b>Category</b>	Encroachment
<b>Type</b>	General item Flow path
<b>Description</b>	Sea container (including the associated pad constructed for the sea container to sit on) impedes flow; No defined drainage flow path.
<b>Photo ID</b>	463
<b>Scope of Works</b>	H – Remove sea container and pad and reinstate flow path L - Reinstate drainage flow path as defined by the natural channel invert of downstream lot

**2.5 Lot No. 302 Pinderi Crescent**



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense vegetation.
<b>Photo ID</b>	376
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain L - Reinststate drainage flow path as defined by the natural channel invert of downstream lot.

## 2.6 Lot No. 303 Pinderi Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense vegetation
<b>Photo ID</b>	376
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.




## 2.7 Lot No. 304 Pinderi Crescent

<p>Photo</p>	
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<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Rear access
<b>Description</b>	Shed, plus rear access and modified topography impedes flow
<b>Photo ID</b>	742, 1033
<b>Scope of Works</b>	L – Remove shed. H – Remove rear access and reinstate drainage flow path as defined by the natural channel invert of downstream lot.

## 2.8 Lot No. 305 Pinderi Crescent

<p>Photo</p>	
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<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Vegetation is low with defined shallow channel directing flow to open rocky space.
<b>Photo ID</b>	375
<b>Scope of Works</b>	None required



### 3. Flynn Crescent (Portland Crescent lots)

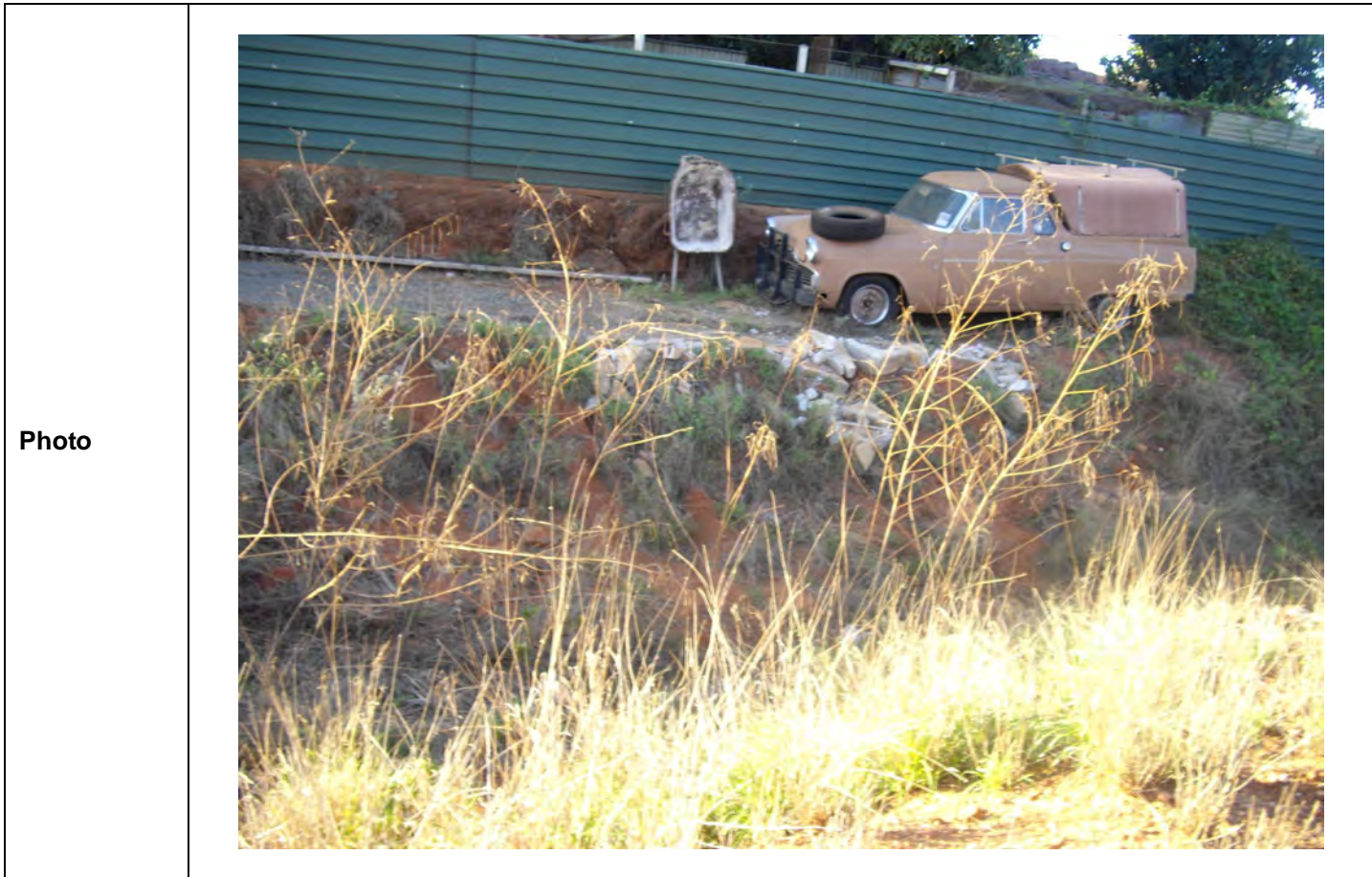
This section refers to the street drainage along Flynn Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Portland Crescent.

Flynn Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into the drainage reserve between it and Hospital drive.

The drainage reserve received and conveys flows from the rear half of the Portland Crescent lots. This discharges in a westerly direction to the drainage reserve between Flynn Crescent and Hospital Drive.



### 3.1 Lot No. 291 Portland Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Side access driveway General items. Boundary extension
<b>Description</b>	Side access driveway follows natural topography. Car (on southern side of property), trailer (on western side of property) Parking area (southern side of property) creating a batter encroachment and reducing cross sectional capacity and fence encroachment.
<b>Photo ID</b>	678 & 469 – photo is of southern side of subject property
<b>Scope of Works</b>	Side access driveway noted. No works required. L – Remove trailer and car; L – Remove parking area and batter encroachment and reinstate drainage flow path as defined by the natural channel invert of downstream lot. H - Remove existing fence and relocate to within property boundary.

### 3.2 Lot No. 292 Portland Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Vegetation Boundary Extension
<b>Description</b>	Vegetation overgrowth impeding on flow. Well defined channel. Fence on south western corner is within drainage reserve.
<b>Photo ID</b>	752
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain. L – Remove existing fence and relocate to within property boundary – get confirmation from survey.

### 3.3 Lot No. 293 Portland Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Dense Vegetation inhibiting flow.
<b>Photo ID</b>	751
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



### 3.4 Lot No. 294 Portland Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access Vegetation
<b>Description</b>	Rear access with culvert.
<b>Photo ID</b>	750
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural channel invert of downstream lot L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

### 3.5 Lot No. 295 Portland Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation; Modified reserve.
<b>Description</b>	Vegetation impeding flow; Maintained parking area within the drainage reserve. Drainage reserve has a defined channel which contains flow meaning the maintained parking area does not impact on flow.
<b>Photo ID</b>	749
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain. L – Illegal activity - noted, using drainage reserve for parking area.

### 3.6 Lot No. 296 Portland Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation;
<b>Description</b>	Dense low lying vegetation
<b>Photo ID</b>	748
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



### 3.7 Lot No. 297 Portland Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Vegetation
<b>Description</b>	Fence encroachment altering the flow path. Semi dense vegetation
<b>Photo ID</b>	465 – subject property in middle of photo with green fence.
<b>Scope of Works</b>	H – Remove existing backyard encroachment and relocate to within property boundary. L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

### 3.8 Lot No. 298 Portland Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access General item
<b>Description</b>	Rear access with culvert with unknown entry point. Sheds
<b>Photo ID</b>	466
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural channel capacity and invert of downstream lot. L – Remove sheds



## 4. Stirling Crescent (Flynn Crescent lots)


This section refers to the street drainage along Stirling Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Flynn Crescent.

Stirling Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hospital drive.

The drainage reserve received and conveys flows from the rear half of the Flynn Crescent lots. This discharges in a westerly direction to the drainage reserve between Flynn Crescent and Hospital Drive.




**4.1 Lot No. 227 Flynn Crescent**

<p><b>Photo</b></p>	
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<p><b>Category</b></p>	<p>Drain Maintenance</p>
<p><b>Type</b></p>	<p>Flow path</p>
<p><b>Description</b></p>	<p>Natural topography and flow path still adequate.</p>
<p><b>Photo ID</b></p>	<p>743</p>
<p><b>Scope of Works</b></p>	<p>None</p>

**4.2 Lot No. 228 Flynn Crescent**

<p><b>Photo</b></p>	
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<p><b>Category</b></p>	<p>Drain Maintenance</p>
<p><b>Type</b></p>	<p>Flow Path</p>
<p><b>Description</b></p>	<p>Und Natural topography and flow path still adequate.</p>
<p><b>Photo ID</b></p>	<p>744 – photo of cream coloured roof in centre of photo.</p>
<p><b>Scope of Works</b></p>	<p>None</p>


**4.3 Lot No. 229 Flynn Crescent**

<p><b>Photo</b></p>	
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<p><b>Category</b></p>	<p>Encroachment</p>
<p><b>Type</b></p>	<p>General items; Rear access; Flow path</p>
<p><b>Description</b></p>	<p>Sea container, caravan and 2 x vehicles; Rear access following modified topography; Flow path impeded by lot 230 topographical modifications</p>
<p><b>Photo ID</b></p>	<p>457</p>
<p><b>Scope of Works</b></p>	<p>L - Remove sea container, caravan and vehicles; L – Remove rear access and reinstate drainage flow path as defined by the natural channel capacity and invert of downstream lot.</p>



**4.4 Lot No. 230 Flynn Crescent**

<p><b>Photo</b></p>	
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<p><b>Category</b></p>	<p>Encroachment</p>
<p><b>Type</b></p>	<p>Boundary extension; Flow path.</p>
<p><b>Description</b></p>	<p>Potential encroachment from fence Modified drainage flow path Modified topography</p>
<p><b>Photo ID</b></p>	<p>458</p>
<p><b>Scope of Works</b></p>	<p>L - Remove existing and relocate boundary extension to within property boundary – get confirmation from survey; H - Reinstate drainage flow path as defined by the natural channel capacity and invert of downstream lot (from lot 234 – 230).</p>

**4.5 Lot No. 231 Flynn Crescent**

<p><b>Photo</b></p>	
---------------------	---

<p><b>Category</b></p>	<p>Drain Maintenance/ Encroachment</p>
<p><b>Type</b></p>	<p>Rear access Flow path.</p>
<p><b>Description</b></p>	<p>Rear access and modified topography; Modified topography</p>
<p><b>Photo ID</b></p>	<p>745</p>
<p><b>Scope of Works</b></p>	<p>L - Remove rear access. L - Reinstate drainage flow path as defined by the natural channel capacity and invert of downstream lot (from lot 234 – 230).</p>

**4.6 Lot No. 232 Flynn Crescent**

<p><b>Photo</b></p>	
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<p><b>Category</b></p>	<p>Encroachment/ Drain maintenance</p>
<p><b>Type</b></p>	<p>General items Flow path.</p>
<p><b>Description</b></p>	<p>Boat and cyclone weights. Modified topography</p>
<p><b>Photo ID</b></p>	<p>459</p>
<p><b>Scope of Works</b></p>	<p>L - Remove boat L - Reinstate drainage flow path as defined by the natural channel capacity and invert of downstream lot (from lot 234 – 230).</p>



#### 4.7 Lot No. 233 Flynn Crescent



<b>Category</b>	Encroachment/Drain maintenance
<b>Type</b>	General items Flow path.
<b>Description</b>	Boat and building material Modified topography
<b>Photo ID</b>	26
<b>Scope of Works</b>	L - Remove boat and building materials H - Reinstate drainage flow path as defined by the natural channel capacity and invert of downstream lot (from lot 234 – 230).

#### 4.8 Lot No. 234 Flynn Crescent

<b>Photo</b>	
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<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Rear access
<b>Description</b>	Fence; Filled in rear access does not impede flow
<b>Photo ID</b>	746
<b>Scope of Works</b>	L – Remove fence and relocate to within property boundary – check survey. H - Reinstate drainage flow path as defined by the natural channel capacity and invert of downstream lot (from lot 234 – 230).



## 5. Hartog Crescent (Stirling Crescent lots)

This section refers to the street drainage along Hartog Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Stirling Crescent.

Hartog Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hospital drive.

The drainage reserve received and conveys flows from the rear half of the Stirling Crescent lots. This discharges in a westerly direction to the drainage reserve between Hartog Crescent and Hospital Drive.



## 5.1 Lot No. 235 Stirling Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Flow path
<b>Description</b>	Semi – dense vegetation. Downstream lot of West to East drainage and there is little to no definition of flow path. Original intended design intent not apparent.
<b>Photo ID</b>	764
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; H Reinstatement drainage flow path as defined by the natural channel capacity and invert of downstream lot.

## 5.2 Lot No. 236 Stirling Crescent



<b>Category</b>	Drain Maintenance/ Encroachment
<b>Type</b>	Rear access Flow path Vegetation
<b>Description</b>	Rear access Modified flow path Semi dense vegetation
<b>Photo ID</b>	763 – subject lot on the middle right of photo with rear access.
<b>Scope of Works</b>	H - Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot channel L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 5.3 Lot No. 237 Stirling Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Boundary extension; General items; Flow path.
<b>Description</b>	Rear access and modified topography; Fence Sea container (to the right (outside) of photograph.) No defined drainage flow path due to modified topography.
<b>Photo ID</b>	468
<b>Scope of Works</b>	L - Remove rear access L - Remove existing fence and relocate to within property boundary L - Remove sea container H – Reinststate drainage flow path as defined by the natural capacity and invert of downstream lot channel



#### 5.4 Lot No. 238 Stirling Crescent

<b>Photo</b>	
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<b>Category</b>	Encroachment
<b>Type</b>	Rear access Flow path.
<b>Description</b>	Rear access and modified topography; No defined drainage flow path due to modified topography.
<b>Photo ID</b>	467
<b>Scope of Works</b>	L - Remove rear access; M – remove imported material H – Reinststate drainage flow path as defined by the natural capacity and invert of downstream lot channel

### 5.5 Lot No. 239 Stirling Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Vegetation General items Filled materials
<b>Description</b>	Semi-dense vegetation; Trailer.
<b>Photo ID</b>	19
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain L – Remove trailer and fill material M - Reinststate drainage flow path as defined by the natural capacity and invert of downstream lot channel

## 5.6 Lot No. 240 Stirling Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension; Rear access; Ill defined flow path.
<b>Description</b>	Fence; Rear access and modified topography; No defined flow path within reserve due to modified topography.
<b>Photo ID</b>	759
<b>Scope of Works</b>	H - Remove existing fence and relocate to within property boundary; L - Remove rear access; H - Reinstate drainage flow path as defined by the natural capacity and invert of downstream lot channel



## 5.7 Lot No. 241 Stirling Crescent

<p><b>Photo</b></p>	
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<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension; Rear access; General items; Fill material Vegetation
<b>Description</b>	Fence Rear access and modified topography Trailer, car; No defined drainage within reserve due to modified topography.
<b>Photo ID</b>	758
<b>Scope of Works</b>	L - Remove existing fence and relocate to within property boundary L - Remove trailer and car H - Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot channel L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 5.8 Lot No. 242 Stirling Crescent

<p>Photo</p>	
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<b>Category</b>	Drain Maintenance
<b>Type</b>	Hard stand turning circle
<b>Description</b>	Turning circle following modified topography. It is not clear which lot the turning circle is to be associated with. No defined drainage flow path due to modified topography.– top of catchment does not affect flow
<b>Photo ID</b>	757
<b>Scope of Works</b>	L - Reinstate drainage flow path to flow towards lot 243

## 5.9 Lot No. 243 Stirling Crescent

<b>Photo</b>	
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<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Boundary extension Vegetation
<b>Description</b>	Fence is within drainage reserve having no impact on flow; Semi-dense vegetation
<b>Photo ID</b>	753
<b>Scope of Works</b>	L – Remove existing fence and relocate to within property boundary; L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain;



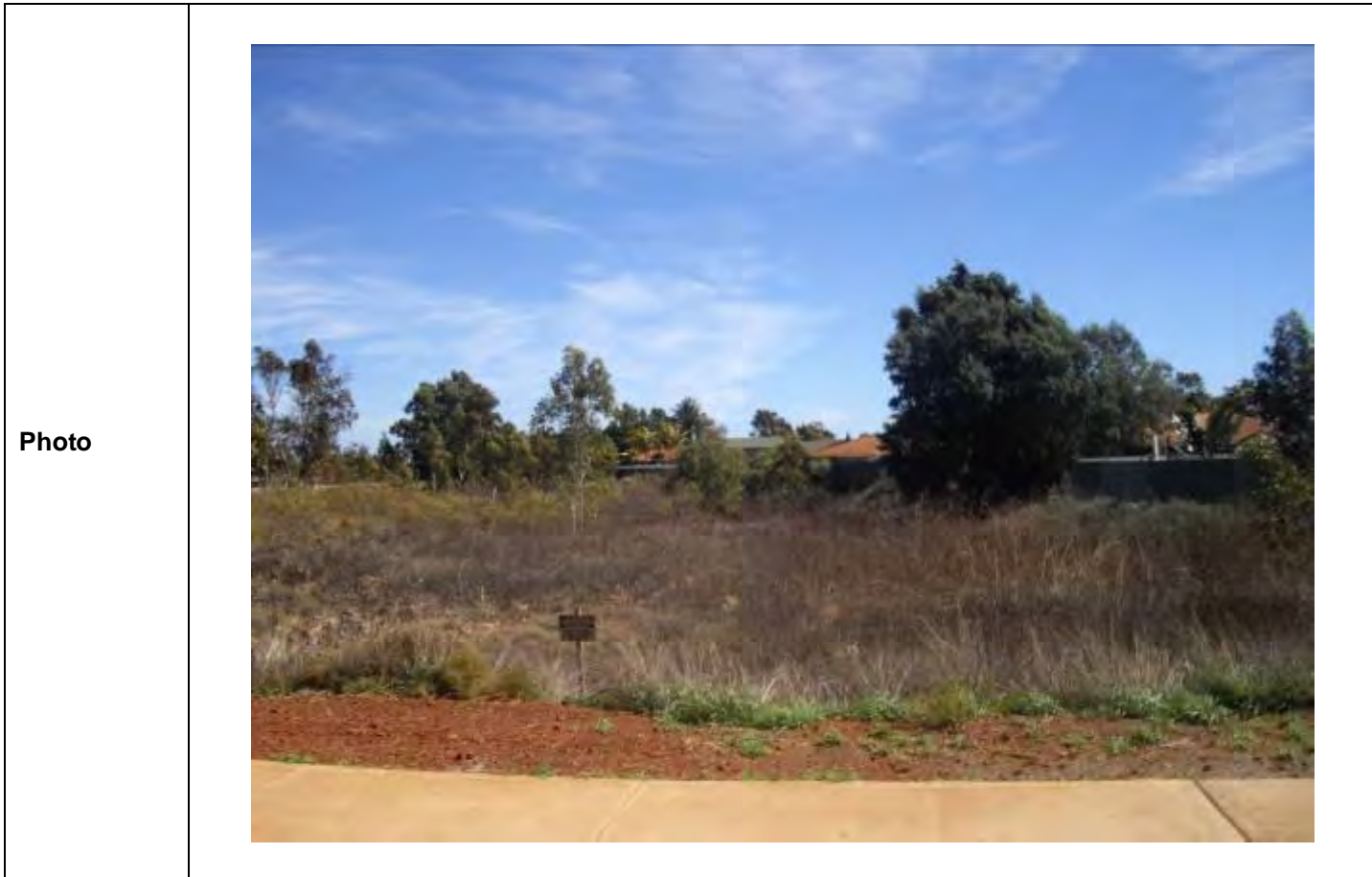


## 6. Dampier Drive (Hartog Crescent lots)

This section refers to the street drainage along Dampier Drive and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Hartog Crescent.


The drainage reserve received and conveys flows from the rear half of the Hartog Crescent lots. This discharges in a westerly direction to the drainage reserve between Hartog Crescent and Hospital Drive.

## 6.1 Lot No. 244 Hartog Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Vegetation impeding flow but the reserve is of a large capacity created by the raising of the road reserve and lot boundary.
<b>Photo ID</b>	765
<b>Scope of Works</b>	None required

## 6.2 Lot No. 245 Hartog Crescent

<p>Photo</p>	
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<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Vegetation impeding flow but the reserve is of a large capacity created by the raising of the road reserve and lot boundary.
<b>Photo ID</b>	766
<b>Scope of Works</b>	None required



### 6.3 Lot No. 246 Hartog Crescent

<b>Photo</b>	
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<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Vegetation impeding flow but the reserve is of a large capacity created by the raising of the road reserve and lot boundary.
<b>Photo ID</b>	767
<b>Scope of Works</b>	None required

#### 6.4 Lot No. 247 Hartog Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Vegetation impeding flow but the reserve is of a large capacity created by the raising of the road reserve and lot boundary.
<b>Photo ID</b>	767
<b>Scope of Works</b>	None required

## 6.5 Lot No. 248 Hartog Crescent

<p>Photo</p>	
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<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Vegetation impeding flow but the reserve is of a large capacity created by the raising of the road reserve and lot boundary.
<b>Photo ID</b>	768
<b>Scope of Works</b>	None required

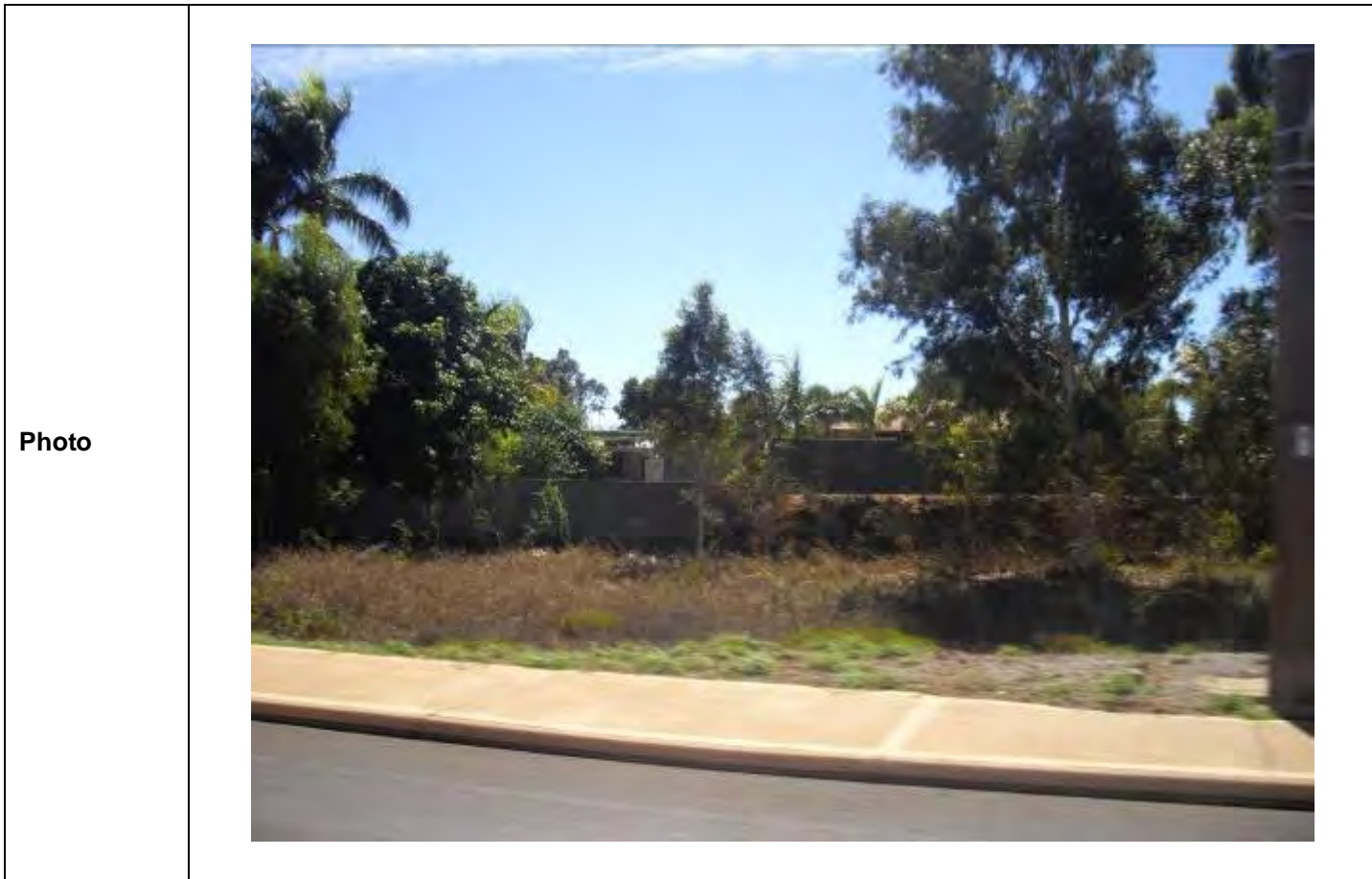


## 6.6 Lot No. 249 Hartog Crescent

<b>Photo</b>	
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<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Vegetation impeding flow but the reserve is of a large capacity created by the raising of the road reserve and lot boundary.
<b>Photo ID</b>	769
<b>Scope of Works</b>	None required

## 6.7 Lot No. 250 Hartog Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Vegetation impeding flow but the reserve is of a large capacity created by the raising of the road reserve and lot boundary.
<b>Photo ID</b>	769
<b>Scope of Works</b>	None required





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		Name	Signature	Name	Signature	Date
A	A Dow	M Stovold		G Yandle		20/1/11





CLIENTS | PEOPLE | PERFORMANCE

**Rio Tinto Iron Ore**  
Report on Dampier Drainage  
Review  
Block 3 Encroachments  
June 2010



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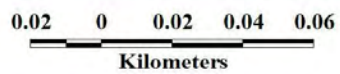


# 1. Block 3 Encroachments



LEGEND

- Roads
- Cadastre
- Block Boundary
- Encroachment - Low
- Encroachment - Medium
- Encroachment - High



Map Projection: Universal Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia 1994  
Grid: Map Grid of Australia, Zone 50



CLIENTS | PEOPLE | PERFORMANCE

**RioTinto**

Client Name: RTIO  
Project Name: Dampier Drainage Assessment

**Block 3 Encroachments**

Job Number | 6125224  
Revision | A  
Date | 17/08/2010

**Figure 1**

G:\DIR\JOB\DIR\WORKSPACE\NAME\WOR © 2010. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason. Data source: Data Custodian, Data Set Name/Title, Version/Date Created by: 239 Adelaide Terrace Perth WA 6004 Australia T 61 8 6222 8222 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au





## 2. Elliot Crescent (Patterson Crescent Lots)

This section refers to the street drainage along Elliot Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Patterson Crescent.

Elliot Crescent receives and conveys flow from the front half of its upstream lots. This discharges in an easterly direction. It has a “sag” behind Patterson Crescent 324 where water collects and discharges into the sump

The drainage reserve received and conveys flows from the rear half of the Patterson Crescent lots. This discharges in a westerly direction to rocky open space.

Flow drains to sump behind lot 324, which collects runoff and appears to discharge to vacant land north of Patterson crescent via a pipe under lot 324. The boundary between lot 321 and 322 is the catchment divide. Lot 321 drain east, whilst Lot 322 drains west to lot 324 sump. Lot 330 is also a catchment divide, with Lot 329 draining east towards lot 324 sump.

Works required are intended to enable water to flow towards the sump in lot 324 unimpeded and also out of the sump north of Patterson. The sump should be cleaned out and rock lined with a headwall being constructed around the outlet pipe. The condition of pipe out of the sump is unclear and should be checked as part of the works.



## 2.1 Lot No. 320 Patterson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography; No defined channel in drainage reserve; Flow is directed towards road reserve.
<b>Photo ID</b>	9
<b>Scope of Works</b>	L - Remove rear access and reinstate flow path directed toward road reserve.

## 2.2 Lot No. 321 Patterson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear Access; General items.
<b>Description</b>	Rear access follows natural topography - doesn't affect flow; Bus parked in drainage reserve.
<b>Photo ID</b>	10
<b>Scope of Works</b>	L – Remove rear access L - Remove bus;

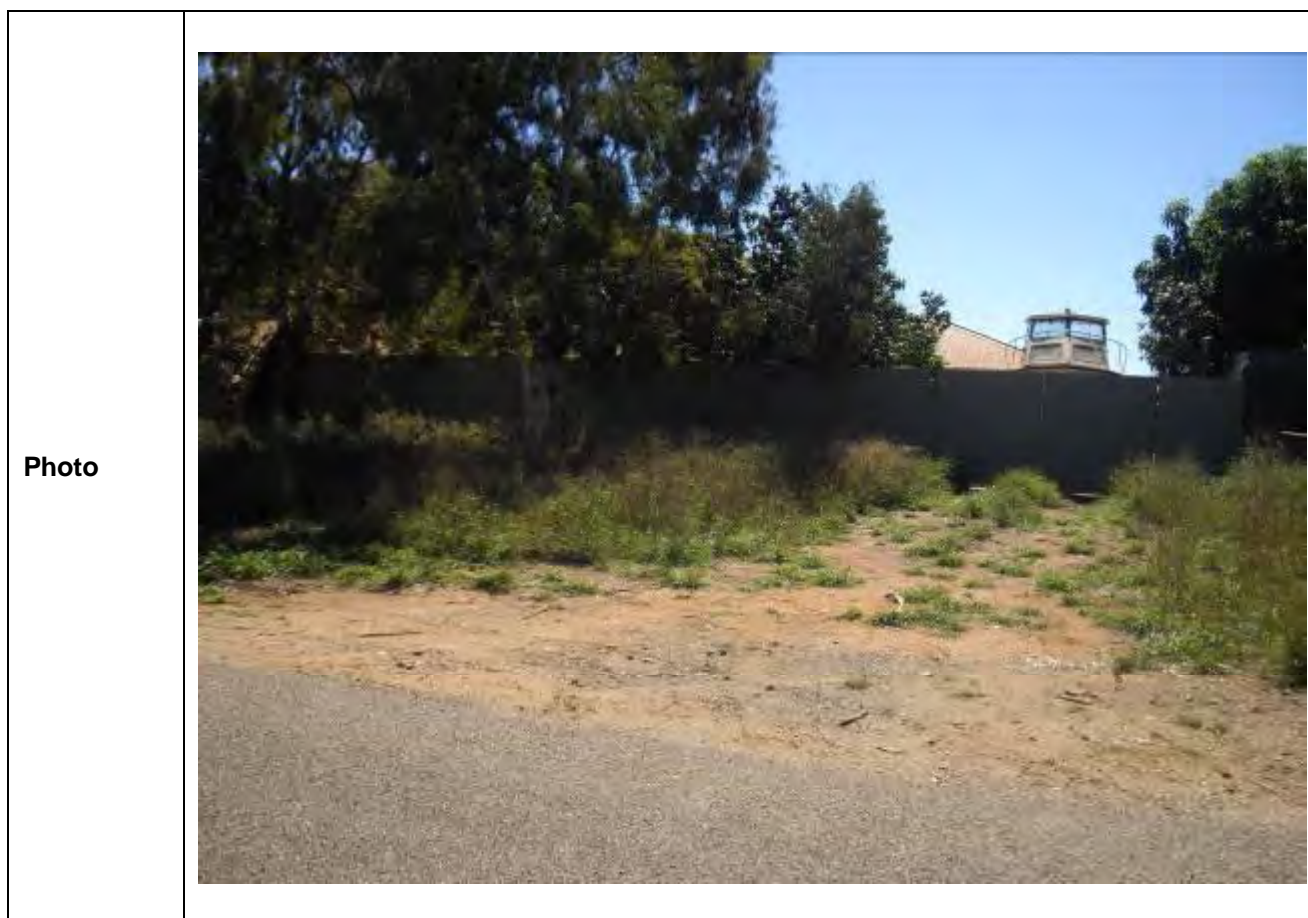
### 2.3 Lot No. 322 Patterson Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension; General items; Topographical impedance.
<b>Description</b>	Fence located within drainage reserve; Barrels; Rocks are natural – doesn't affect flow. Flow path is directed towards the road reserve - adequate.
<b>Photo ID</b>	977 ,771
<b>Scope of Works</b>	L - Remove existing secondary fence; L – Remove barrels;



## 2.4 Lot No. 323 Patterson Crescent



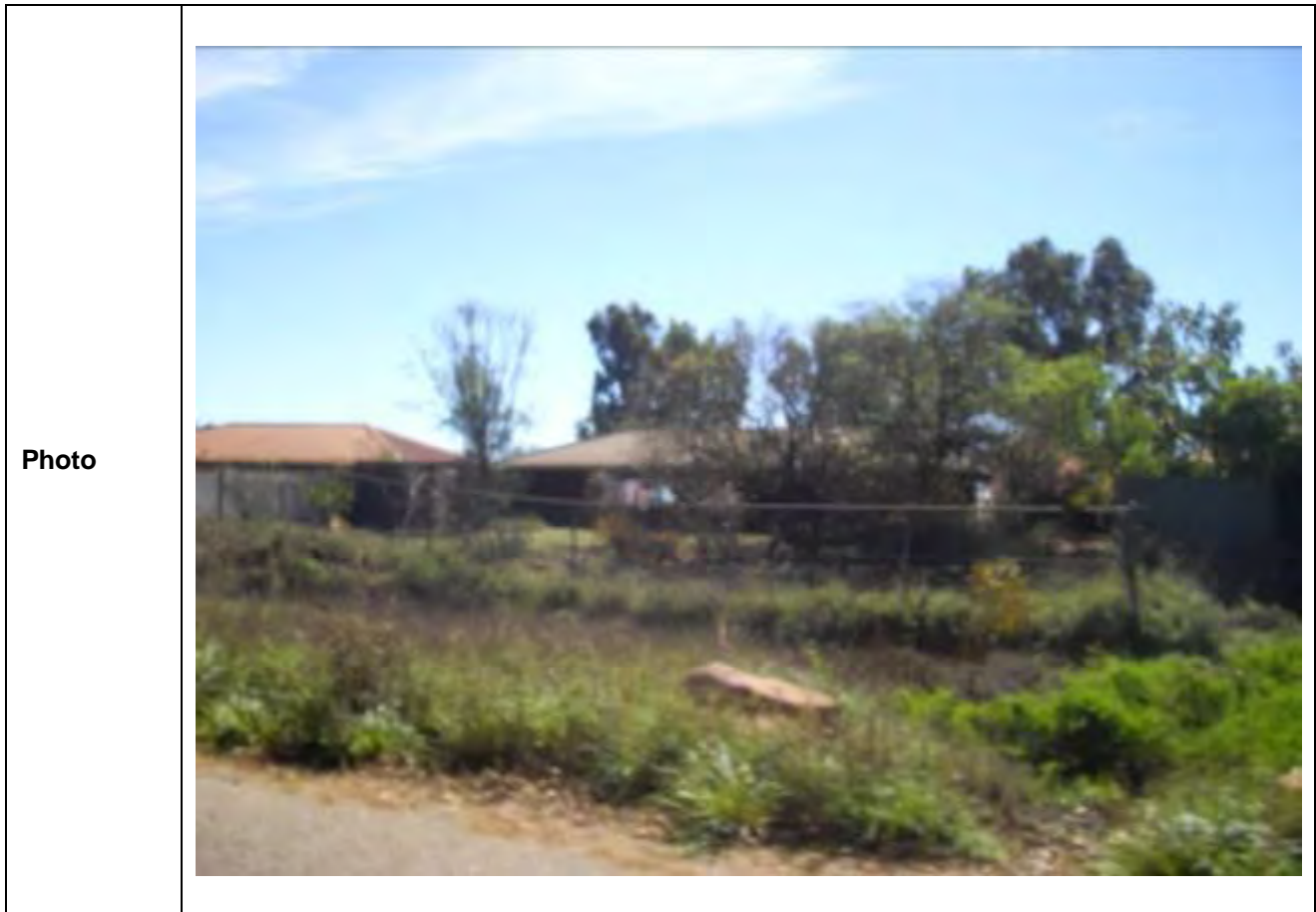
<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension; Rear Access; Vegetation.
<b>Description</b>	Potential boundary encroachment from fence; Rear access follows the natural topography - doesn't affect flow; Semi-dense vegetation - impedes flow.
<b>Photo ID</b>	772
<b>Scope of Works</b>	M - Remove existing fence and relocate boundary extension to within property boundary - get confirmation from survey; L - Remove rear access and construct defined channel directing flow west to lot 324 sump; M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

## 2.5 Lot No. 324 Patterson Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Sump - blocked; Vegetation.
<b>Description</b>	Drainage reserve has sump that is meant to discharge under lot 324 to north of Patterson. Sump is blocked and overgrown with vegetation - does not function as required. Condition of inlet and outlet pipes unknown. Dense vegetation - impeding flow.
<b>Photo ID</b>	978, 773
<b>Scope of Works</b>	<p>H – Clean out material and vegetation blocking sump. Rock pitch around sump outlet. Stabilise inlet and outlet pipes with concrete headwalls. Check condition of outlet pipe.</p> <p>H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.</p> <p>L – Land to be rezoned as drainage reserve or redesigned by certified engineer to not encroach on property boundary.</p>

## 2.6 Lot No. 325 Patterson Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Rear access; Vegetation.
<b>Description</b>	Rear access follows natural topography; Dense vegetation impeding flow.
<b>Photo ID</b>	774
<b>Scope of Works</b>	M - Remove rear access and construct defined channel directing flow east to lot 324 sump; M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 2.7 Lot No. 326 Patterson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items; Boundary Encroachment Ill defined flow path
<b>Description</b>	Building/demolition material located in the drainage reserve; Shed Flat area
<b>Photo ID</b>	775
<b>Scope of Works</b>	L - Remove building/demolition materials; L – Remove existing shed and relocate to within property boundary.- get confirmation from survey; L – Construct defined channel directing flow east to lot 324.

## 2.8 Lot No. 327 Patterson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension, General items; III defined flow path.
<b>Description</b>	Rear yard landscaping; Building material; III defined flow path due to landscaping.
<b>Photo ID</b>	470
<b>Scope of Works</b>	L - Remove existing landscaping including vegetation; L – Remove building material. Construct defined channel directing flow east to lot 324.

## 2.9 Lot No. 328 Patterson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access, Ill defined flow path.
<b>Description</b>	Rear access follows natural topography, but has limited affect on flow. Ill defined flow path due to landscaping
<b>Photo ID</b>	980 ,776
<b>Scope of Works</b>	L - Remove rear access L - Construct defined channel directing flow east to lot 324.



**2.10 Lot No. 329 Patterson Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension; Rear access; Ill defined flow path.
<b>Description</b>	Fence extends perpendicular to road; Rear access follows natural topography; Ill defined flow path due to landscaping
<b>Photo ID</b>	680
<b>Scope of Works</b>	L - Remove fence; L - Remove rear access L - Construct defined channel directing flow east to lot 324.

**2.11 Lot No. 330 Patterson Crescent**



<b>Category</b>	Drain Maintenance
<b>Type</b>	Ill defined flow path
<b>Description</b>	Rocks form catchment divide – do not affect flow
<b>Photo ID</b>	777
<b>Scope of Works</b>	None – rocks form catchment divide - do not affect flow.



### 3. Yule Crescent (Elliot Crescent lots)

This section refers to the street drainage along Yule Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Elliot Crescent.

Yule Crescent receives and conveys flow from the front half of its upstream lots. This discharges in an easterly direction from Lot 256 and west from lot 257.

The drainage reserve received and conveys flows from the rear half of the Elliot Crescent lots. This discharges in an easterly direction. A sump at lot 335 collects and discharges water to Patterson Crescent drainage reserve.

Works required are intended to maintain flow east along the drainage reserve.



### 3.1 Lot No. 331 Elliot Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	General items; Vegetation; Ill defined flow path.
<b>Description</b>	2 x boats; Dense vegetation impeding flow. No evidence of original intended design – catchment divide no works required.
<b>Photo ID</b>	988 ,8
<b>Scope of Works</b>	L - Remove boats H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain L – Top of catchment no works required

### 3.2 Lot No. 332 Elliot Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access; Vegetation; General items; Ill defined flow path.
<b>Description</b>	Rear access impeding flow; Vehicle; Thick low lying vegetation that will impede flow; No evidence of original intended design.
<b>Photo ID</b>	987 – photo is of property with dark green fence with 3 mini vans and boat with cover on it.
<b>Scope of Works</b>	H - Remove rear access; L – Remove vehicle; H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; H – Construct defined channel directing flow east.

### 3.3 Lot No. 333 Elliot Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access; Vegetation; Fill.
<b>Description</b>	Rear access follows contours; Thick low lying vegetation that will impede flow; Drainage reserve is above road level. Fill area potentially from excavated material from lot 333 Elliot Crescent.
<b>Photo ID</b>	986 – photo is of property with dark green fence
<b>Scope of Works</b>	L - Remove rear access and reinstate flow path H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; H – Remove fill and construct defined drainage channel directing flow east.



### 3.4 Lot No. 334 Elliot Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Vegetation Organic waste
<b>Description</b>	Thick low lying vegetation that will impede flow within the channel. Organic waste has been dumped within the existing drainage channel.
<b>Photo ID</b>	985
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; H - Organic waste to be removed from drain and returned to natural channel cross section.

### 3.5 Lot No. 335 Elliot Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access with culvert; Vegetation.
<b>Description</b>	Rear access impeding flow; Semi-dense vegetation in channel and reserve.
<b>Photo ID</b>	984
<b>Scope of Works</b>	H - Remove access and reinstate drainage to downstream cross sectional capacity; H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

### 3.6 Lot No. 336 Elliot Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access; Vegetation.
<b>Description</b>	Rear access with culvert Drainage reserve has sump that is meant to discharge under lot 336 to Patterson lot 324. Sump is blocked and overgrown with vegetation - does not function as required. Condition of inlet and outlet pipes unknown Dense vegetation within channel and reserve – impedes flow
<b>Photo ID</b>	983
<b>Scope of Works</b>	H - Remove rear access and reinstate drainage flow path. H – Clean out material and vegetation blocking sump. Rock pitch around sump outlet. Stabilise inlet and outlet pipes with concrete headwalls. Check condition of outlet pipe. H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



### 3.7 Lot No. 337 Elliot Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Rocks
<b>Description</b>	Thick low lying vegetation that will impede flow Rocks form catchment divide do not impede flow
<b>Photo ID</b>	982
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain. L – Rocks form catchment divide - do not impede flow

### 3.8 Lot No. 338 Elliot Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension; General items; No flow path.
<b>Description</b>	Potential backyard extension Trailer, caravan, sea container No flow path due to flat topography
<b>Photo ID</b>	981 ,472
<b>Scope of Works</b>	L - Remove existing and relocate boundary extension to within property boundary – get confirmation from survey; L - Remove trailer, caravan and sea container; L - Modify drainage reserve to redefine drainage flow path to direct east.

### 3.9 Lot No. 339 Elliot Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension, Rear access Modified flow path
<b>Description</b>	Fence; Rear access impeding flow; Original design intent not apparent.
<b>Photo ID</b>	471
<b>Scope of Works</b>	L - Remove existing fence and relocate to within property boundary; M - Remove rear access; L - Construct defined drainage channel directing flow east.



### 3.10 Lot No. 340 Elliot Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Modified flow path
<b>Description</b>	Rear access follows natural topography; Original flow path appears to be an overland flow directed to the west and towards the road - adequate as kerb and road acts as main stormwater conveyer.
<b>Photo ID</b>	790
<b>Scope of Works</b>	L - Remove rear access and reinstate flow path; H - Modify drainage reserve to construct defined drainage channel directing flow east.



## 4. Wilkie Crescent (Yule Crescent lots)

This section refers to the street drainage along Wilkie Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Yule Crescent.

Wilkie Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Yule Crescent lots. This discharges in an easterly direction from Lot 254 and west from lot 255.

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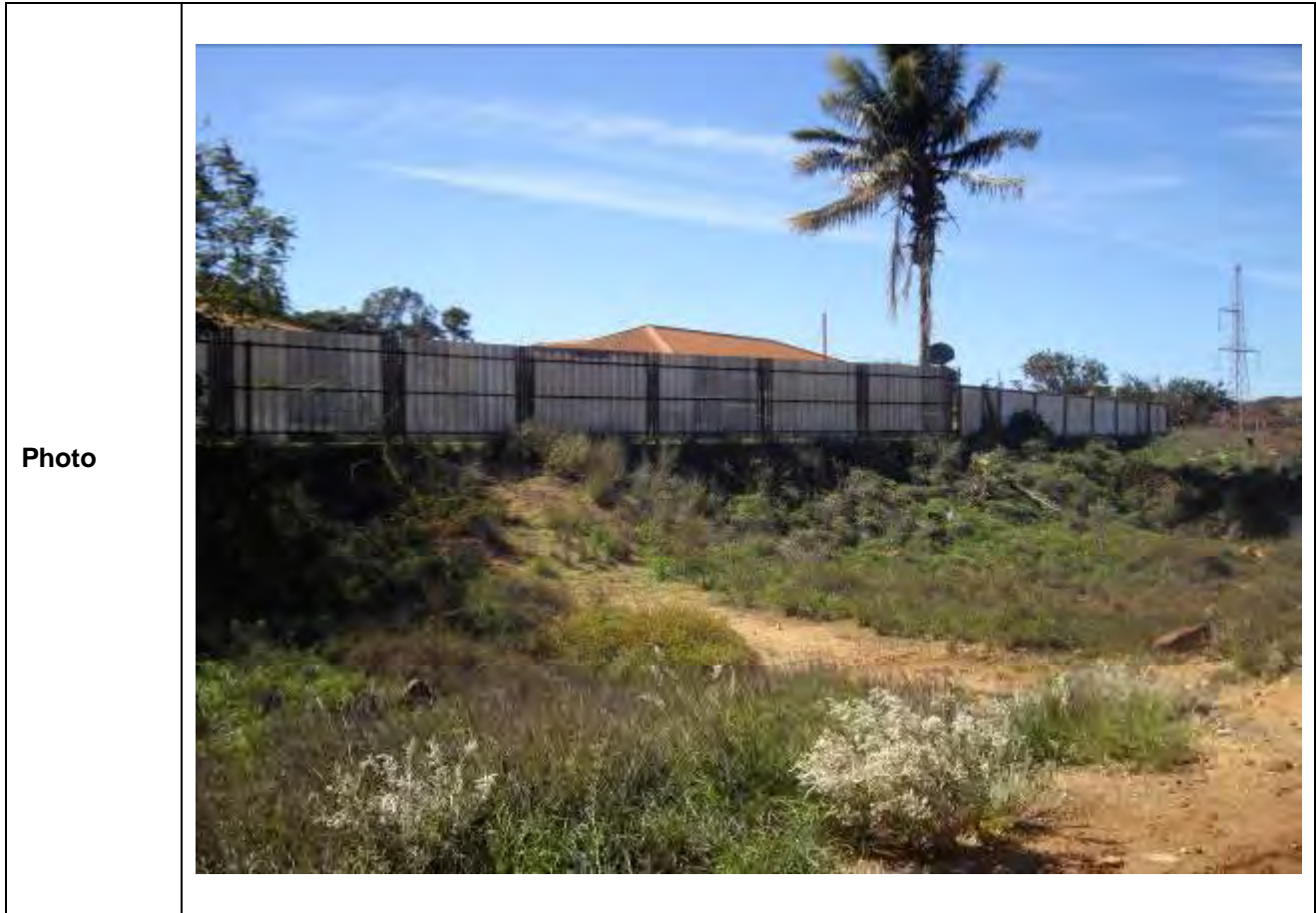
#### 4.1 Lot No. 1,251 Yule Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Drainage reserve is not conveying a collected body of water but is providing a slope for the stormwater to dissipate to the end of the east - west reserve. Lot drainage operates effectively.
<b>Photo ID</b>	778 – photo is of far lot
<b>Scope of Works</b>	None



## 4.2 Lot No. 251 Yule Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography - not impeding flow, natural slope provides flow path.
<b>Photo ID</b>	779
<b>Scope of Works</b>	L - Rear access noted, no works required.

### 4.3 Lot No. 252 Yule Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	General items; Vegetation.
<b>Description</b>	Rubbish; Dense vegetation.
<b>Photo ID</b>	780
<b>Scope of Works</b>	L - Remove rubbish; L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain;

#### 4.4 Lot No. 253 Yule Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Hard stand area
<b>Description</b>	Hard stand area follows drain contours to the east - not impeding flow.
<b>Photo ID</b>	781
<b>Scope of Works</b>	L - Hard stand area noted - no works required.



#### 4.5 Lot No. 254 Yule Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access General items
<b>Description</b>	Rear access impeding flow; 2 x boat, trailer; Rubble.
<b>Photo ID</b>	1000, 999, 1001, 1002, 15
<b>Scope of Works</b>	H - Remove rear access and reinstate drainage channel to direct flow east. L - Remove boats and trailer H – Remove rubble

#### 4.6 Lot No. 255 Yule Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; General items. Ill defined channel
<b>Description</b>	Rear access follows natural topography; Boat. Original intended drainage flow path not evident.
<b>Photo ID</b>	782
<b>Scope of Works</b>	L - Remove rear access; L - Remove boat; L – Modify drainage reserve to define drainage channel to direct flow west (match to 256).

#### 4.7 Lot No. 256 Yule Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access No flow path Vegetation
<b>Description</b>	Rear access follows natural topography; No drainage flow path evident; Overgrown vegetation impeding flow.
<b>Photo ID</b>	783
<b>Scope of Works</b>	L - Remove rear access; L - Modify drainage reserve to define drainage channel to direct flow west (match to 255); L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



#### 4.8 Lot No. 257 Yule Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	No flow path
<b>Description</b>	No drainage path evident within drainage reserve and no evidence of original design intent. Drainage reserve slopes towards the road - adequate.
<b>Photo ID</b>	784
<b>Scope of Works</b>	L - Modify drainage reserve to define drainage channel to direct flow west (match to 256);

#### 4.9 Lot No. 258 Yule Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	No flow path
<b>Description</b>	No drainage path evident within drainage reserve and no evidence of original design intent. Natural topography directs stormwater to the west.
<b>Photo ID</b>	785
<b>Scope of Works</b>	H - Construct defined drainage channel to direct flow west (match to 257);



## 5. Pingandy Crescent (Wilkie Crescent lots)

This section refers to the street drainage along Pingandy Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Wilkie Crescent.

Pingandy Crescent receives and conveys flow from the front half of its upstream lots. This discharges in discharges east from lot 267 and discharges west from lot 268.

The drainage reserve received and conveys flows from the rear half of the Wilkie Crescent lots. This discharges in an easterly direction from Lot 262 and west from lot 261.

|



## 5.1 Lot No. 1,259 Wilkie Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Lot configuration.
<b>Description</b>	Rear access - impedes flow; Lot configuration creates 'bottle neck'.
<b>Photo ID</b>	794
<b>Scope of Works</b>	H – Remove rear access and construct defined channel to direct flow west.

## 5.2 Lot No. 259 Wilkie Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Modified drainage channel; Rear access.
<b>Description</b>	Batter encroachment in the form of a parking area; Rear access follows drainage contours with minor impedance to flow.
<b>Photo ID</b>	681
<b>Scope of Works</b>	L - Remove batter / parking area and reinstate drainage channel to upstream capacity L – Remove rear access.

### 5.3 Lot No. 260 Wilkie Crescent

Photo




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Category	Drain Maintenance / Encroachment
Type	Vegetation General item
Description	Semi-dense <u>un</u> maintained vegetation – inhibits flow Trailer
Photo ID	991
Scope of Works	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; L – Remove trailer.



## 5.4 Lot No. 261 Wilkie Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Ill defined flow path Rear access; General items.
<b>Description</b>	Topography of reserve is relatively flat; Rear access impeding flow; Mounded fill potentially causing sedimentation within the drain. Boat trailers
<b>Photo ID</b>	4
<b>Scope of Works</b>	L - Modify drainage reserve to define drainage channel to direct flow west H - Remove rear access and reinstate drainage flow path L - Remove mounded fill and boat trailers

**5.5 Lot No. 262 Wilkie Crescent**



<b>Category</b>	Drain maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Vegetation impeding flow
<b>Photo ID</b>	3
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain;

**5.6 Lot No. 263 Wilkie Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows drainage contours – does not impede flow
<b>Photo ID</b>	990
<b>Scope of Works</b>	L - Rear access noted. No scope of works required.

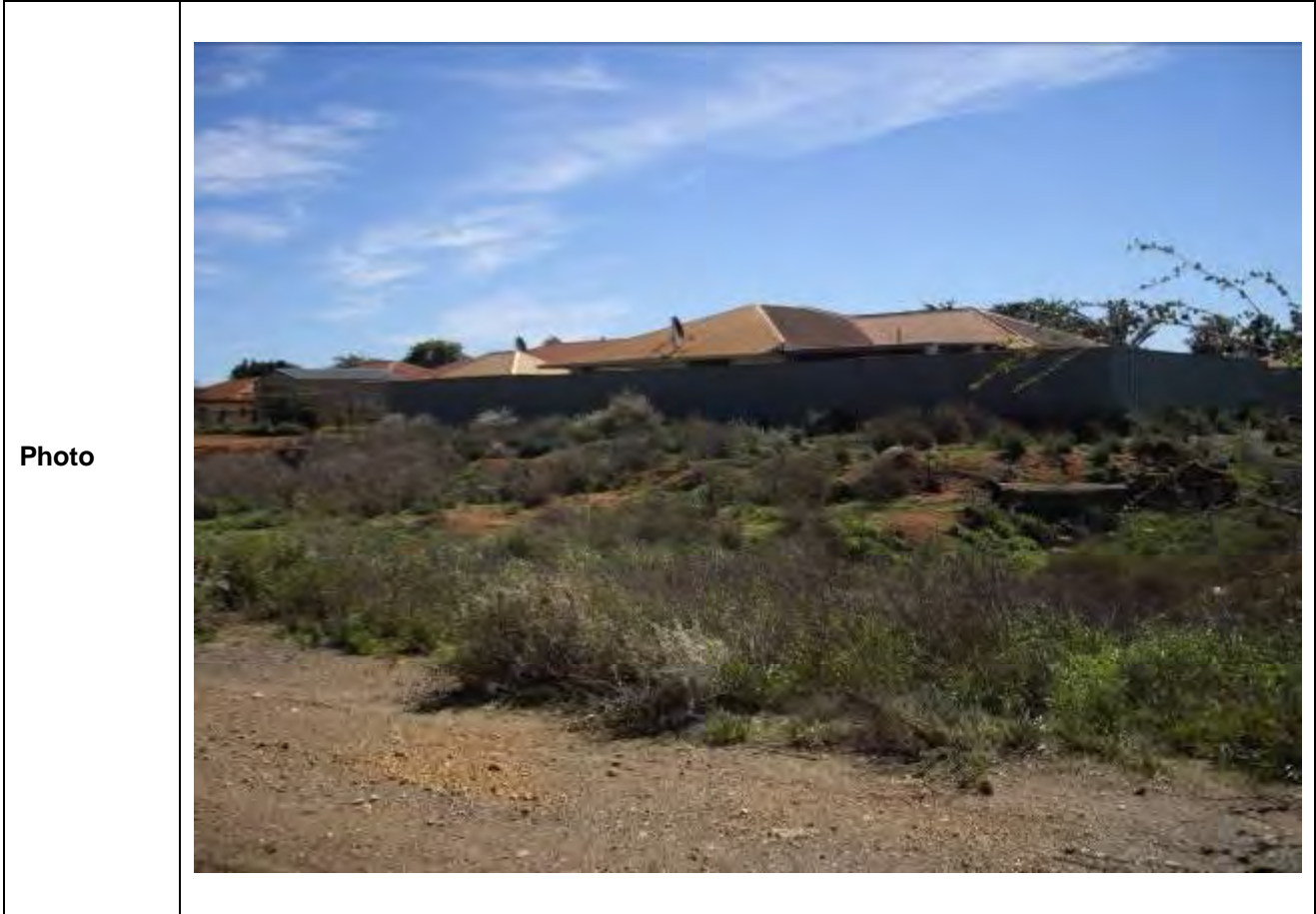


## 5.7 Lot No. 264 Wilkie Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Potential extended fill having a small impact on capacity of natural channel. Fill does not appear to be compacted and may be easily eroded causing sedimentation within the drain.
<b>Photo ID</b>	989, 474
<b>Scope of Works</b>	H – Confirmation of boundary required from survey. Measures required to prevent erosion of uncompacted fill within property boundary and removal of fill outside of property boundary.

**5.8 Lot No. 265 Wilkie Crescent**



<b>Category</b>	Drain Maintenance
<b>Type</b>	Ill defined flow path
<b>Description</b>	Not defined drainage flow path due to natural topography.
<b>Photo ID</b>	793
<b>Scope of Works</b>	L - Modify drainage reserve define drainage channel to direct flow east.



## 6. Stuart Crescent (Pingandy Crescent lots)

This section refers to the street drainage along Stuart Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Pingandy Crescent.

Stuart Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Pingandy Crescent lots. This discharges in an easterly direction from Lot 267 and west from lot 269.

Modifications to drainage reserve are such that constructed defined flow path required from lot 269 to 273 to direct water west along drainage reserve to remove impediments.



## 6.1 Lot No. 266 Pingandy Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Vegetation. Boundary Extension
<b>Description</b>	Dense overgrown vegetation but not impeding the full width of the reserve; Fence
<b>Photo ID</b>	786 – photo shows vegetation, fence in relation to the road.
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain: L – Remove existing fence and relocate to within property boundary – get confirmation from survey.

## 6.2 Lot No. 267 Pingandy Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow
<b>Photo ID</b>	477
<b>Scope of Works</b>	H - Remove rear access and construct defined drainage channel to direct flow east.

### 6.3 Lot No. 268 Pingandy Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow (upstream is also blocked making a depression at this lot; as shown in photo)
<b>Photo ID</b>	17 – green fence is lot 268
<b>Scope of Works</b>	H - Remove rear access and construct defined drainage channel to direct flow east.



## 6.4 Lot No. 269 Pingandy Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Vegetation; Rear access.
<b>Description</b>	Dense unmaintained vegetation. Rear access follows drainage contours having a small impact on drainage.
<b>Photo ID</b>	787
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain. L – Remove rear access and construct defined drainage channel to direct flow west.

## 6.5 Lot No. 270 Pingandy Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Vegetation; Rear access.
<b>Description</b>	Dense overgrown vegetation; Rear access impedes flow.
<b>Photo ID</b>	788 – rear access is on the western edge of photo.
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; L – Remove rear access and construct defined drainage channel to direct flow west (match to 269).

## 6.6 Lot No. 271 Pingandy Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items; Rear access
<b>Description</b>	Sea container, boat. Rear access on top of completely fill drainage reserve. Original intended drainage reserve is not evident.
<b>Photo ID</b>	18, 996
<b>Scope of Works</b>	L - Remove sea container and boats L – Remove rear access and construct defined drainage channel to direct flow west (match to 270).



## 6.7 Lot No. 272 Pingandy Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Vegetation; Rear access.
<b>Description</b>	Dense overgrown vegetation impeding flow; Rear access follows on top of completely filled area. Original natural topography not apparent.
<b>Photo ID</b>	995, 789
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; L - Remove rear access and construct defined drainage channel to direct flow west (match to 271).

## 6.8 Lot No. 273 Pingandy Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow. Original natural topography not apparent.
<b>Photo ID</b>	478
<b>Scope of Works</b>	H - Remove access way and construct defined drainage channel to direct flow west (match to 271).



## 7. Robe Crescent (Stuart Crescent lots)

This section refers to the street drainage along Robe Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Stuart Crescent.

Robe Crescent receives and conveys flow from the front half of its upstream lots. This discharges in an easterly direction.

The drainage reserve received and conveys flows from the rear half of the Stuart Crescent lots. This discharges in an easterly direction from Lot 280 and west from lot 279.

|



**7.1 Lot No. 274 Stuart Crescent**



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Large capacity natural drainage channel as a result of raising of lot and road reserve.
<b>Photo ID</b>	383 – Subject property at centre-right portion of photo.
<b>Scope of Works</b>	None

## 7.2 Lot No. 275 Stuart Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Large capacity natural drainage channel as a result of risen lot and road reserves.
<b>Photo ID</b>	801 – Subject lot is middle property within photo
<b>Scope of Works</b>	None

### 7.3 Lot No. 276 Stuart Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Modified drain; Rear access.
<b>Description</b>	Batter encroachment in large capacity drain in the form of a parking area which reduces cross sectional capacity; Rear access follows natural topography of drain.
<b>Photo ID</b>	682
<b>Scope of Works</b>	L - Remove batter encroachment and reinstate drainage channel to direct flow west (match to 277); L - Remove rear access noted. No major works required.



#### 7.4 Lot No. 277 Stuart Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access General Item
<b>Description</b>	Rear access driveway follows natural topography.
<b>Photo ID</b>	800 – photo does not show the inspection ramps
<b>Scope of Works</b>	L - Remove rear access and reinstate flow path to direct flow west (match to 276); L – Remove inspection ramps.

## 7.5 Lot No. 278 Stuart Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access, General items
<b>Description</b>	Rear access driveway following contour of natural topography; 2 x boats, trailer and water tank.
<b>Photo ID</b>	799
<b>Scope of Works</b>	L - Remove rear access noted. No major works required. L - Remove boats, trailer and water tank.

## 7.6 Lot No. 279 Stuart Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography.
<b>Photo ID</b>	798 – subject property starts at tank on the right and ends at start of silver coloured fence on left.
<b>Scope of Works</b>	L - Rear access noted. No major works required.



## 7.7 Lot No. 280 Stuart Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access, general items
<b>Description</b>	Rear access follows natural topography having minor impact on flow; Sea container.
<b>Photo ID</b>	796
<b>Scope of Works</b>	L - Remove rear access and construct defined drainage channel to direct flow east (match to lot 281). L - Remove sea container

**7.8 Lot No. 281 Stuart Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; General items.
<b>Description</b>	Rear access follows natural topography having minor impact on flow path; 3 x vehicles
<b>Photo ID</b>	993
<b>Scope of Works</b>	L - Remove rear access and reinstate drainage flow path to direct flow east. L - Remove vehicles



**7.9 Lot No. 282 Stuart Crescent**



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None
<b>Photo ID</b>	992
<b>Scope of Works</b>	None





## 8. Dampier Drive (Robe Crescent lots)

This section refers to the street drainage along Dampier Drive and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Robe Crescent.

The drainage reserve receives and conveys flows from the rear half of the Robe Crescent lots. This discharges in a westerly direction.

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**8.1 Lot No. 283 Robe Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Potential boundary extension from fence.
<b>Photo ID</b>	476 – subject property is on the left side of property.
<b>Scope of Works</b>	L - Remove existing and relocate boundary extension to within property boundary – get confirmation from survey.

## 8.2 Lot No. 284 Robe Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Drains east via natural channel - adequate.
<b>Photo ID</b>	803
<b>Scope of Works</b>	None



### 8.3 Lot No. 285 Robe Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	No drainage path due to development of park.
<b>Photo ID</b>	804
<b>Scope of Works</b>	N/A

#### 8.4 Lot No. 286 Robe Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	No drainage path due to development of park.
<b>Photo ID</b>	805
<b>Scope of Works</b>	N/A

## 8.5 Lot No. 287 Robe Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	No drainage path
<b>Photo ID</b>	806
<b>Scope of Works</b>	N/A



**8.6 Lot No. 288 Robe Crescent**



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	No drainage path.
<b>Photo ID</b>	807
<b>Scope of Works</b>	N/A

**8.7 Lot No. 289 Robe Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Organic matter
<b>Description</b>	Branches placed within the drainage reserve.
<b>Photo ID</b>	808
<b>Scope of Works</b>	L - Remove branches.

## 8.8 Lot No. 290 Robe Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Modified drain
<b>Description</b>	Property has extended its flat area which has created a batter encroachment on the drainage reserve. Flat area is of uncompacted fill which will erode and create sediment into the drainage network.
<b>Photo ID</b>	683
<b>Scope of Works</b>	H - Remove batter encroachment.







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**Rio Tinto Iron Ore**  
Report on Dampier Drainage  
Review  
Block 4a Encroachments  
September 2010



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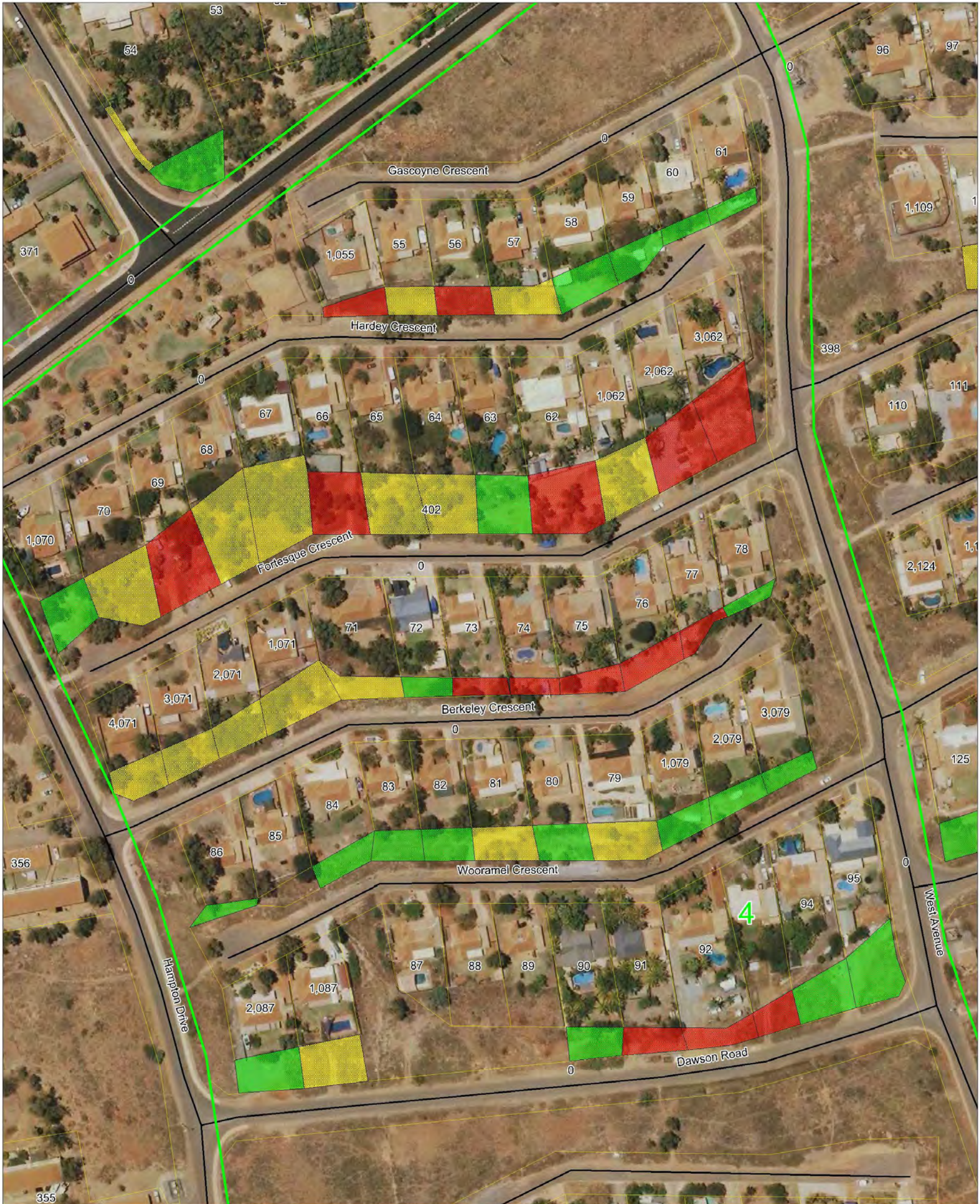
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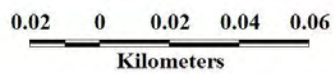


# 1. Block 4a Encroachments



LEGEND

- Roads
- Cadastre
- Block Boundary
- Encroachment - Low
- Encroachment - Medium
- Encroachment - High



Map Projection: Universal Transverse Mercator  
 Horizontal Datum: Geocentric Datum of Australia 1994  
 Grid: Map Grid of Australia, Zone 50



## RioTinto

Client Name: RTIO  
 Project Name: Dampier Drainage Assessment  
**Block 4a Encroachments**

Job Number | 6125224  
 Revision | A  
 Date | 17/08/2010

### Figure 1

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## 2. Hardey Crescent (Gascoyne Crescent lots)

This section refers to the street drainage along Hardey Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Gascoyne Crescent.

Hardey Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hampton Drive.

The drainage reserve received and conveys flows from the rear half of the Gascoyne Crescent lots. This discharges in a westerly direction to the parkland between Hardey Crescent and Dampier Road.

## 2.1 Lot 1,055 Gascoyne Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow.
<b>Photo ID</b>	518
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot channel

## 2.2 Lot No. 55 Gascoyne Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation Natural flow path adequate
<b>Photo ID</b>	811 – photo of property with the darker fence.
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



### 2.3 Lot No. 56 Gascoyne Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Fill material
<b>Description</b>	Semi-dense vegetation.
<b>Photo ID</b>	810
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain H – remove fill material and drainage flow path as defined by the natural capacity and invert of downstream (lot 55) channel

## 2.4 Lot No. 57 Gascoyne Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access, Boundary extension, General items
<b>Description</b>	Rear access driveway and modified topography with no defined channel, Possible boundary extension in south-eastern corner, Storage of boat and vehicles
<b>Photo ID</b>	517
<b>Scope of Works</b>	M – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot channel L – Remove boundary extension in the south western corner of property and relocate to within property boundary. L – Remove boat and vehicles.

## 2.5 Lot No. 58 Gascoyne Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension Vegetation
<b>Description</b>	Shed is well within the drainage reserve Modified topography but does not impede flow Vegetation within drainage reserve
<b>Photo ID</b>	516
<b>Scope of Works</b>	L - Remove shed to within property boundary L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 2.6 Lot No. 59 Gascoyne Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items
<b>Description</b>	Caravan Modified flow path – does not impede flow
<b>Photo ID</b>	7322
<b>Scope of Works</b>	L - Remove caravan

## 2.7 Lot No. 60 Gascoyne Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Rear access.
<b>Description</b>	Rear access follows modified topography directs flow to road - adequate.
<b>Photo ID</b>	809
<b>Scope of Works</b>	L – Remove rear access

## 2.8 Lot No. 61 Gascoyne Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Backyard extension Highly modified drainage reserve
<b>Description</b>	Fence extends to within drainage reserve; Natural flow path apparent and and adequate
<b>Photo ID</b>	515
<b>Scope of Works</b>	L - Remove backyard extension





### 3. Fortesque Crescent (Hardey Crescent lots)

This section refers to the street drainage along Fortesque Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Hardey Crescent.

Fortesque Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hampton Drive.

The drainage reserve received and conveys flows from the rear half of the Hardey Crescent lots. This discharges in a westerly direction into Hampton Drive.

### 3.1 Lot No. 3,062 Hardey Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension Vegetation.
<b>Description</b>	Fence on eastern and southern boundaries Semi dense vegetation impedes flow
<b>Photo ID</b>	513
<b>Scope of Works</b>	L - Remove fence and relocate to within property boundary – get confirmation from survey. H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

### 3.2 Lot No. 2,062 Hardey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access, General items
<b>Description</b>	Rear access impeding flow. Blue metal has been imported and appears to have modified the drainage reserve considerably Cars, trailers.
<b>Photo ID</b>	823
<b>Scope of Works</b>	H - Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot (1062). L - Remove cars and trailers.



### 3.3 Lot No. 1,062 Hardey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Modified flow path Vegetation
<b>Description</b>	Rear access with culvert Imported blue metal and fill.
<b>Photo ID</b>	824
<b>Scope of Works</b>	M – Remove rear access reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot M – Remove imported blue metal L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

### 3.4 Lot No. 62 Hardey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Boundary extension
<b>Description</b>	Rear access with culvert including a large amount of fill created into a parking area. Note that this is historically a high risk flooding area; Minor misalignment of the boundary extension.
<b>Photo ID</b>	507
<b>Scope of Works</b>	H - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot (63) L – Remove fence and relocate to within the property boundary.

### 3.5 Lot No. 63 Hardey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items Rear access
<b>Description</b>	General rubbish and swing set Walkway bridge
<b>Photo ID</b>	508
<b>Scope of Works</b>	L - Remove rubbish L – Remove swing set L – Remove rear access



### 3.6 Lot No. 64 Hardey Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense vegetation Natural channel apparent and adequate
<b>Photo ID</b>	509
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 3.7 Lot No. 65 Hardey Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access Vegetation
<b>Description</b>	Rear access follows natural topography Semi-dense vegetation
<b>Photo ID</b>	510
<b>Scope of Works</b>	L – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 3.8 Lot No. 66 Hardey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Vegetation
<b>Description</b>	Rear access with culvert impeding flow; Semi-dense vegetation.
<b>Photo ID</b>	511
<b>Scope of Works</b>	H – Remove access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



### 3.9 Lot No. 67 Hardey Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Rocks ; Vegetation.
<b>Description</b>	Rocks impeding flow; Vegetation impeding flow.
<b>Photo ID</b>	825
<b>Scope of Works</b>	L – Remove rocks M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 3.10 Lot No. 68 Hardey Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation.
<b>Description</b>	Vegetation impeding flow Rocks noted, but natural channel adequate
<b>Photo ID</b>	826
<b>Scope of Works</b>	L – Remove rocks M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

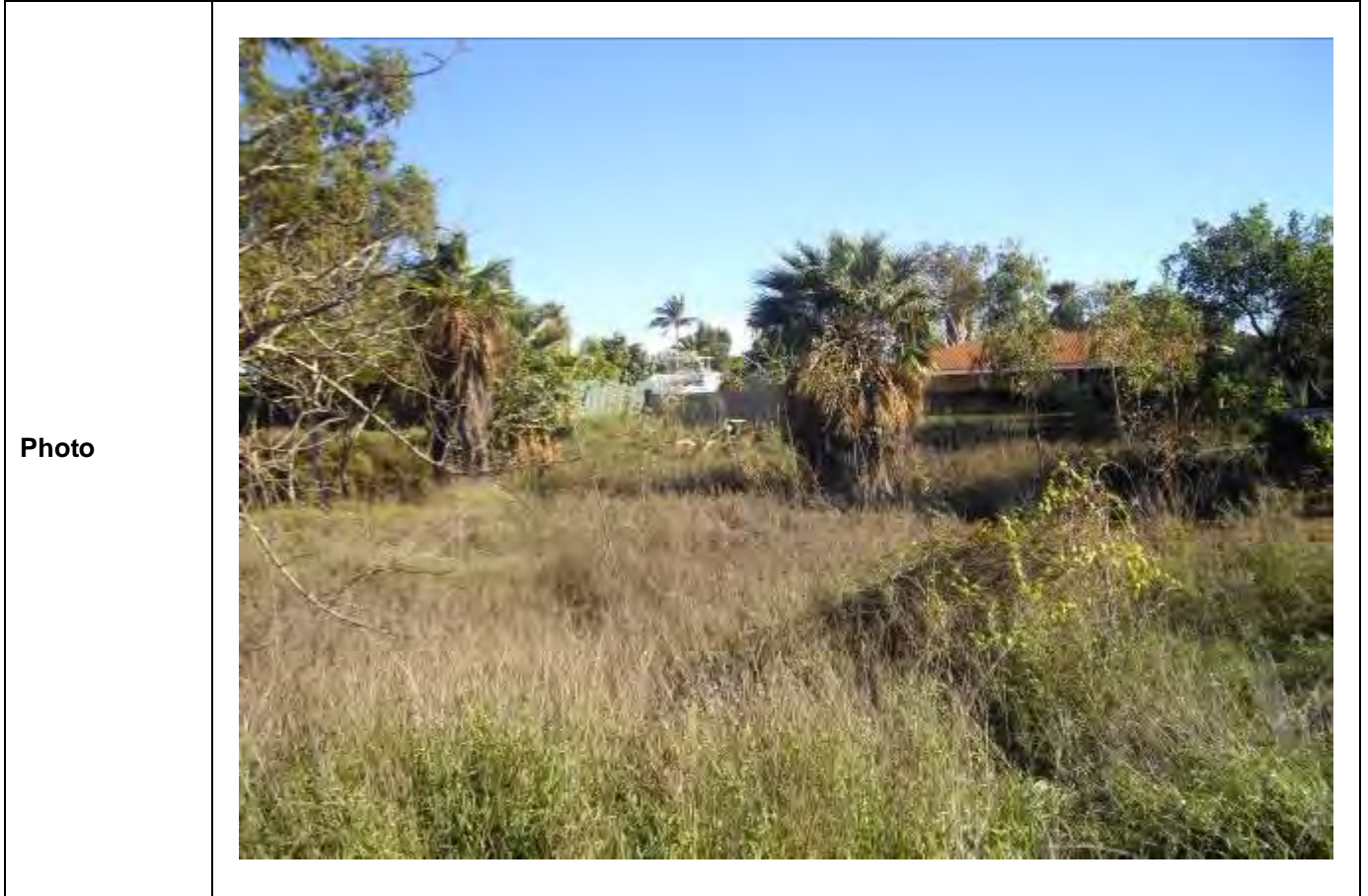
### 3.11 Lot No. 69 Hardey Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Boundary extension General items Vegetation
<b>Description</b>	Rear access with culvert Potential container encroachment Imported loose soil Semi dense vegetation
<b>Photo ID</b>	512
<b>Scope of Works</b>	H - Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot L - Remove container – confirmation required from survey; L – Remove imported loose soil L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



### 3.12 Lot No. 70 Hardey Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense vegetation impeding flow.
<b>Photo ID</b>	827
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 3.13 Lot No. 1,070 Hardey Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Modified drainage reserve
<b>Description</b>	Mounded fill created into bike jumps – flow path adequate
<b>Photo ID</b>	828
<b>Scope of Works</b>	L - Remove bike jumps



## 4. Berkeley Crescent (Fortesque Crescent lots)

This section refers to the street drainage along Berkeley Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Fortesque Crescent.

Berkeley Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hampton drive.

The drainage reserve received and conveys flows from the rear half of the Fortesque Crescent lots. This discharges in a westerly direction into Hampton drive.

Note: Lots 73 – 77 impede upstream flow that is received from Wooramel Crescent. A define flow path is required along these lots that matches into the natural channel capacity and invert of lot 72.



#### 4.1 Lot No. 4,071 Fortesque Crescent



<b>Category</b>	Drain maintenance
<b>Type</b>	Rocks Vegetation
<b>Description</b>	Rocks inhibit flow, but do not impede (bottom of catchment)
<b>Photo ID</b>	1039
<b>Scope of Works</b>	M – Remove rocks M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 4.2 Lot No. 3,071 Fortesque Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Fill
<b>Description</b>	Semi-dense vegetation impeding flow; Cut branches disposed of within drainage reserve.
<b>Photo ID</b>	814
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain M – Remove fill and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot



### 4.3 Lot No. 2,071 Fortesque Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General item
<b>Description</b>	Caravan
<b>Photo ID</b>	1038
<b>Scope of Works</b>	M – Remove caravan.



#### 4.4 Lot No. 1,071 Fortesque Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Vegetation Rear access
<b>Description</b>	Semi-dense vegetation Rear access follows natural topography
<b>Photo ID</b>	813
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain L – Remove rear access

#### 4.5 Lot No. 71 Fortesque Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Vegetation Rocks Rear access
<b>Description</b>	Low lying vegetation impeding flow Rocks impeding flow Rear access follows natural topography
<b>Photo ID</b>	812
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain M – Remove rocks from within the “channel” and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

#### 4.6 Lot No. 72 Fortesque Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation Natural flow path adequate
<b>Photo ID</b>	384
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



#### 4.7 Lot No. 73 Fortesque Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow
<b>Photo ID</b>	482
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot (72)

#### 4.8 Lot No. 74 Fortesque Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Modified reserve; General items.
<b>Description</b>	Rear access and modified topography Fill material potentially due to the excavation of the pool in the subject lot Boat, trailer, barrels, concrete mixer
<b>Photo ID</b>	481
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot (72) H – Remove fill material L – Remove boat, trailer, barrels and concrete mixer.

#### 4.9 Lot No. 75 Fortesque Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access General items
<b>Description</b>	Rear access with culvert and modified topography (Culvert outlet unknown) "Rubbish skip" and general rubbish in the low point of drainage reserve.
<b>Photo ID</b>	480
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot (72) M – Remove rubbish skip and general rubbish.

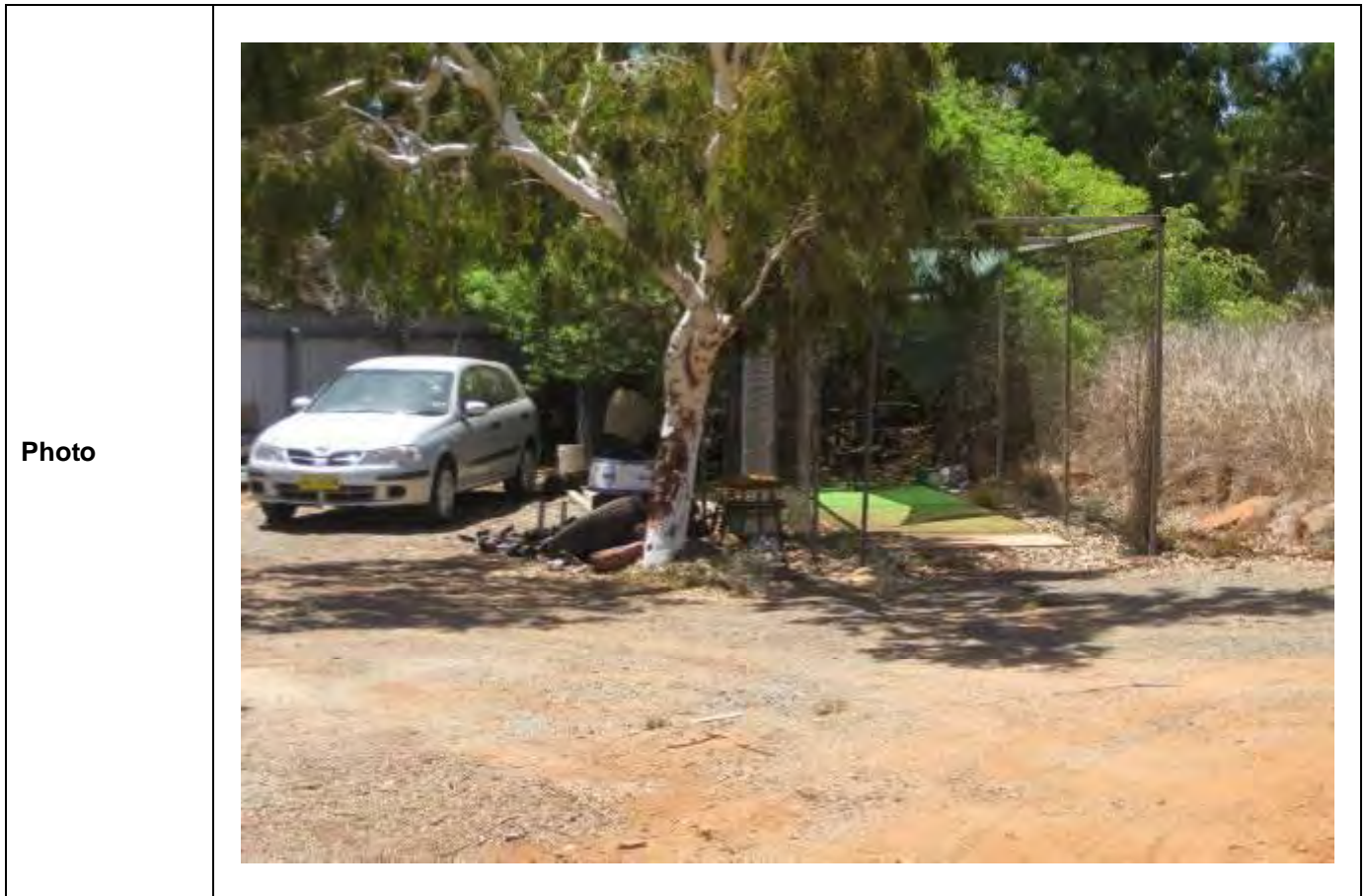


#### 4.10 Lot No. 76 Fortesque Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Flow path
<b>Description</b>	Rear access and modified topography from the fill material; Extensive modification of the drainage reserve due to fill.
<b>Photo ID</b>	479
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot (72) L – Remove fill

#### 4.11 Lot No. 77 Fortesque Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; General items; Flow path.
<b>Description</b>	Rear access and modified topography; Cricket pitch, car, general rubbish; No flow path evident due to extensive fill.
<b>Photo ID</b>	7324
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot (72) H - Remove cricket pitch, car and general rubbish;

#### 4.12 Lot No. 78 Fortesque Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Side access
<b>Description</b>	Side access follows natural topography
<b>Photo ID</b>	514
<b>Scope of Works</b>	L - Remove side access way





## 5. Wooramel Crescent (Berkeley Crescent lots)

This section refers to the street drainage along Wooramel Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Berkeley Crescent.

Wooramel Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hampton Drive.

The drainage reserve received and conveys flows from the rear half of the Berkeley Crescent lots. This discharges in a westerly direction into Hampton Drive.

### 5.1 Lot No. 3,079 Berkeley Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	General items Vegetation
<b>Description</b>	Rubbish, Barrels Semi dense vegetation
<b>Photo ID</b>	497
<b>Scope of Works</b>	L - Remove rubbish and barrels L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 5.2 Lot No. 2,079 Berkeley Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access, General items.
<b>Description</b>	Rear access driveway follows natural topography (top of catchment – doesn't affect flow) Boat and trailer within reserve
<b>Photo ID</b>	1041, 498 – boat not within the photo
<b>Scope of Works</b>	L - Remove access driveway L - Remove boat and trailer



### 5.3 Lot No. 1,079 Berkeley Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Vegetation.
<b>Description</b>	Rear access impeding flow Semi-dense vegetation
<b>Photo ID</b>	499
<b>Scope of Works</b>	H - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

## 5.4 Lot No. 79 Berkeley Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Rocks
<b>Description</b>	Unmaintained, semi-dense vegetation Rocks note, but do not impede flow
<b>Photo ID</b>	815
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

## 5.5 Lot No. 80 Berkeley Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation
<b>Photo ID</b>	501
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 5.6 Lot No. 81 Berkeley Crescent



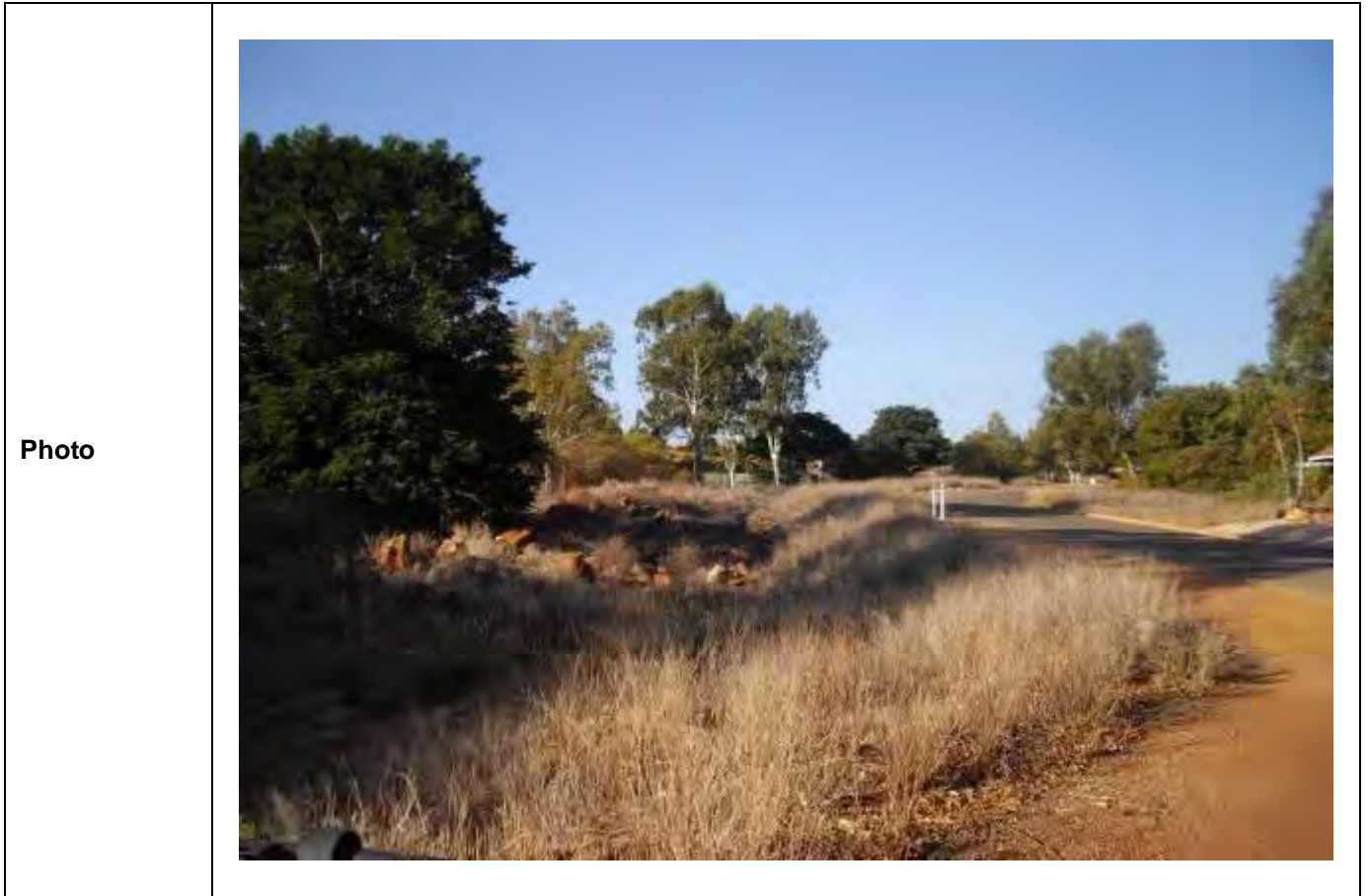
<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access Vegetation
<b>Description</b>	Extended driveway (stops partway over reserve) follows natural topography – channel defined and adequate Semi-dense vegetation
<b>Photo ID</b>	502
<b>Scope of Works</b>	L - Remove access way M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

**5.7 Lot No. 82 Berkeley Crescent**

<p><b>Photo</b></p>	
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<p><b>Category</b></p>	<p>Encroachment</p>
<p><b>Type</b></p>	<p>Boundary extension</p>
<p><b>Description</b></p>	<p>Fence within drainage reserve not impacting on drainage;</p>
<p><b>Photo ID</b></p>	<p>503</p>
<p><b>Scope of Works</b></p>	<p>L – Remove fence and relocate to within the drainage reserve</p>

## 5.8 Lot No. 83 Berkeley Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation
<b>Photo ID</b>	387
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 5.9 Lot No. 84 Berkeley Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation Rocks present, but flow adequate
<b>Photo ID</b>	816
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 5.10 Lot No. 85 Berkeley Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Rocks noted, but don't affect flow path which is adequate
<b>Photo ID</b>	504
<b>Scope of Works</b>	None

### 5.11 Lot No. 86 Berkeley Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Retaining wall within drainage reserve. Slightly reducing the cross sectional capacity but also structurally required to 'retain' the raised lot. Flow path adequate
<b>Photo ID</b>	505
<b>Scope of Works</b>	L – Remove retaining wall and reinstate the property boundary.





## 6. Dawson Road (Wooramel Crescent lots)

This section refers to the street drainage along Dawson Road and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Wooramel Crescent.

Road Road receives and conveys flow that falls on it plus flow from West Street. This discharges in a westerly direction into Hampton Drive.

The drainage reserve received and conveys flows from the rear half of the Wooramel Crescent lots. This discharges in a westerly direction into Hampton Drive.

Note: Lots 91 - 95 impede upstream flow that is received from upstream lots Crescent. A define flow path is required along these lots that matches into the natural channel capacity and invert of lot 92.

## 6.1 Lot No. 2,087 Wooramel Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Filled rear access driveway may not be interfering with drainage - specify intended path. Drainage flow path not clear. Flow West will meet with trunk 'South to North' drainage or flow East then North through drainage reserve then culvert will direct flow under Wooramel Crescent.
<b>Photo ID</b>	488
<b>Scope of Works</b>	L - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream

## 6.2 Lot No. 1,087 Wooramel Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impedes flow. Area of concern – ponding. May be due to encroachment of lots 2,087 and 1,087 or blocked/inadequate culvert under Wooramel Crescent.
<b>Photo ID</b>	487
<b>Scope of Works</b>	M - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot



### 6.3 Lot No. 87 Wooramel Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Natural drainage path evident and adequate
<b>Photo ID</b>	821
<b>Scope of Works</b>	None required.

## 6.4 Lot No. 88 Wooramel Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Natural drainage path evident and adequate
<b>Photo ID</b>	820
<b>Scope of Works</b>	None required

## 6.5 Lot No. 89 Wooramel Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Small channel constructed to improve flow - adequate
<b>Photo ID</b>	819
<b>Scope of Works</b>	None required.



## 6.6 Lot No. 90 Wooramel Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation Small channel defines flow path - adequate
<b>Photo ID</b>	822
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 6.7 Lot No. 91 Wooramel Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access and parking area impeding flow.
<b>Photo ID</b>	486
<b>Scope of Works</b>	H - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

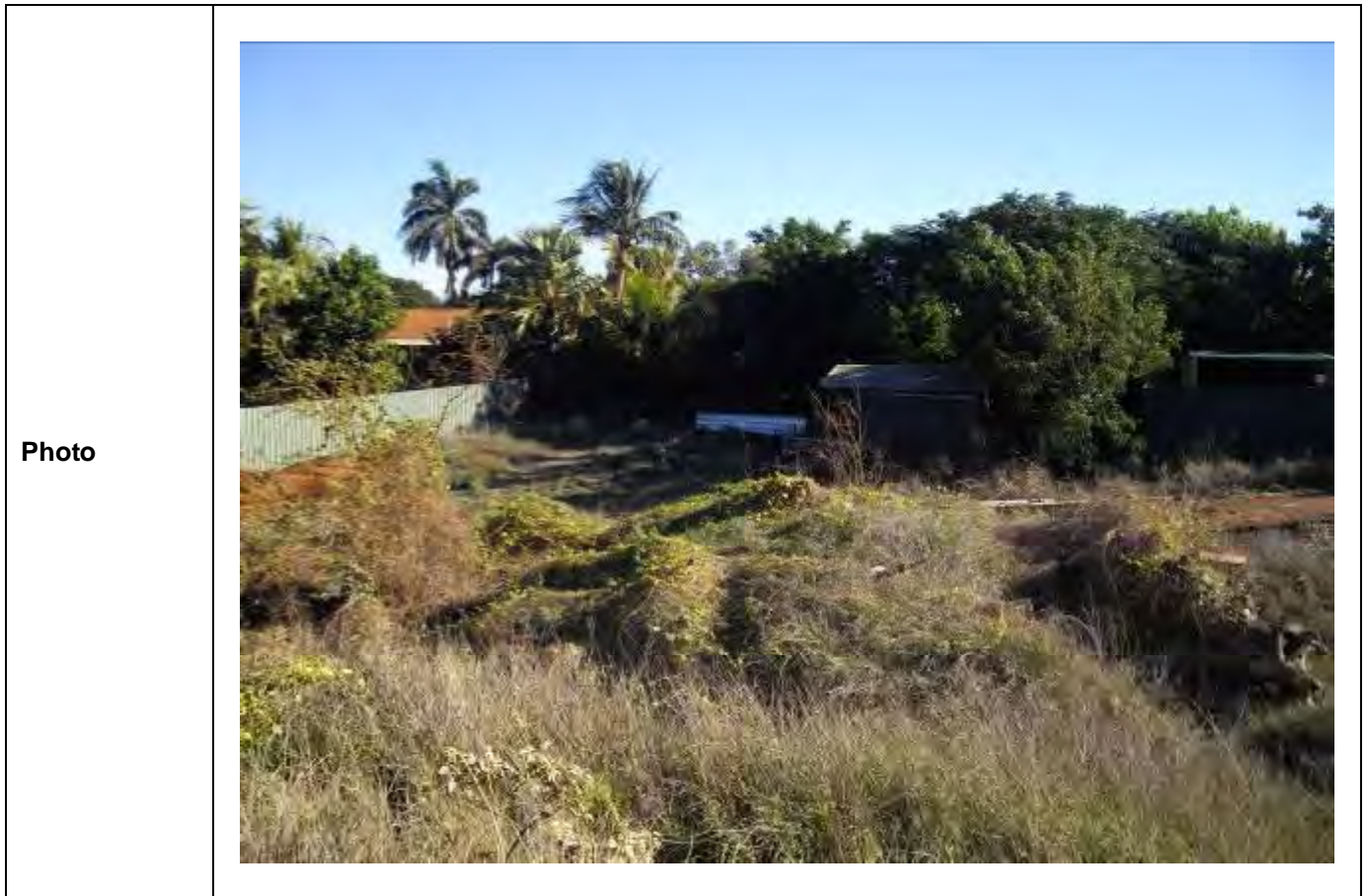
## 6.8 Lot No. 92 Wooramel Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access with culvert
<b>Photo ID</b>	485
<b>Scope of Works</b>	H - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot



## 6.9 Lot No. 93 Wooramel Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Vegetation Rear access driveway
<b>Description</b>	Highly modified drain. Rear access follows the natural topography
<b>Photo ID</b>	818
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain H - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

### 6.10 Lot No. 94 Wooramel Crescent



<b>Category</b>	Encroachment / Drain Management
<b>Type</b>	Rear access General items Vegetation
<b>Description</b>	Rear access follows natural topography Building material
<b>Photo ID</b>	484
<b>Scope of Works</b>	L - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot L - Remove building materials L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

**6.11 Lot No. 95 Wooramel Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Modified reserve
<b>Description</b>	Rear access driveway Blue metal pile
<b>Photo ID</b>	7325
<b>Scope of Works</b>	L - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot L - Remove blue metal pile







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**Document Status**

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	A Dow	M Stovold		G Yandle		20/1/11



CLIENTS | PEOPLE | PERFORMANCE

**Rio Tinto Iron Ore**  
Report on Dampier Drainage  
Review  
Block 4b Encroachments  
June 2010



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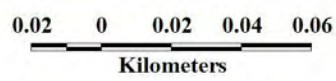


# 1. Block 4b – Encroachments



LEGEND

- Roads
- Cadastre
- Block Boundary
- Encroachment - Low
- Encroachment - Medium
- Encroachment - High



Map Projection: Universal Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia 1994  
Grid: Map Grid of Australia, Zone 50



**RioTinto**

Client Name: RTIO  
Project Name: Dampier Drainage Assessment  
**Block 4b Encroachments**

Job Number: 6125224  
Revision: A  
Date: 17/08/2010

**Figure 1**

G:\DIR\JOB\DIR\WORKSPACE\NAME\WOR 239 Adelaide Terrace Perth WA 6004 Australia T 61 8 6222 8222 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au  
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## 2. Forrest Crescent (Lockyer Crescent lots)

This section refers to the street drainage along Forrest Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Lockyer Crescent.

Forrest Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hampton drive.

The drainage reserve received and conveys flows from the rear half of the Lockyer Crescent lots. This discharges in a westerly direction to Hampton Road.



## 2.1 Lot No. 182 Lockyer Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rocks; Boundary extension
<b>Description</b>	Large rocks but flow adequate Fence
<b>Photo ID</b>	602
<b>Scope of Works</b>	L – Remove large rocks M – Remove fence and relocate to within property boundary

## 2.2 Lot No. 183 Lockyer Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Rocks.
<b>Description</b>	Rear access and modified topography impede flow Large rocks and fill
<b>Photo ID</b>	1047, 601
<b>Scope of Works</b>	L – Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot M – Remove rocks

## 2.3 Lot No. 184 Lockyer Crescent



<b>Category</b>	Encroachment/ Drain Maintenance
<b>Type</b>	Rear access; General items; Boundary extension; Vegetation
<b>Description</b>	Rear access and modified topography; Boat; Shed. Semi-dense low lying vegetation.
<b>Photo ID</b>	7334
<b>Scope of Works</b>	L - Remove rear access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot L - Remove boat; L - Remove shed and relocate to within property boundary – confirmation required from survey. M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 2.4 Lot No. 185 Lockyer Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Hardstand area General items Boundary extension
<b>Description</b>	Road level has been extended towards property boundary to form a parking area. Original cross-sectional capacity has been dramatically reduced Building materials Fence is within the drainage reserve
<b>Photo ID</b>	600
<b>Scope of Works</b>	H - Remove extended parking area and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot L – Remove building materials; M – Remove fence and relocate surveyed boundary

## 2.5 Lot No. 186 Lockyer Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension Vegetation
<b>Description</b>	Mesh fence is perpendicular to road and extends the width of the drainage reserve. Low lying vegetation
<b>Photo ID</b>	7332
<b>Scope of Works</b>	H - Remove fence M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

## 2.6 Lot No. 187 Lockyer Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation
<b>Photo ID</b>	832
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



## 2.7 Lot No. 188 Lockyer Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension – fence; Boundary extension – shed; Rear access; Vegetation.
<b>Description</b>	Rock retaining wall is perpendicular to road and extends the width of the drainage reserve; Garden shed is within the drainage reserve; Rear access is impeding flow; Semi-dense low lying vegetation.
<b>Photo ID</b>	598
<b>Scope of Works</b>	H - Remove rock retaining wall. L – Remove garden shed – confirmation required from survey. H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 2.8 Lot No. 189 Lockyer Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension – mulch area; Boundary extension – retaining wall; Boundary extension – shed; Vegetation.
<b>Description</b>	Fenced off mulch area; Rock retaining wall; Shed on boundary; Semi-dense low lying vegetation
<b>Photo ID</b>	604
<b>Scope of Works</b>	H - Remove fenced off mulch area; H – Remove rock wall. L – Remove shed and relocate to within property boundary – confirmation required from survey. M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 2.9 Lot No. 190 Lockyer Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation Flow path adequate
<b>Photo ID</b>	7331
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 2.10 Lot No. 191 Lockyer Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Rocks
<b>Description</b>	Semi-dense low lying vegetation Very rocky – flow not impeded
<b>Photo ID</b>	831
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; M – Remove rocks impeding low point of drainage flow path.

## 2.11 Lot No. 1,191 Lockyer Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Rocks
<b>Description</b>	Semi-dense low lying vegetation Very rocky but flow path ok (top of catchment)
<b>Photo ID</b>	830
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain L – Remove rocks from drainage flow path



### 3. Gregory Crescent (Forrest Crescent lots)

This section refers to the street drainage along Gregory Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Forrest Crescent.

Gregory Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hampton drive.

The drainage reserve received and conveys flows from the rear half of the Forrest Crescent lots. This discharges in a westerly direction to Hampton Road.



### 3.1 Lot No. 192 Forrest Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension Vegetation
<b>Description</b>	Extended boundary on southern and eastern sides of lots; Semi-dense low lying vegetation.
<b>Photo ID</b>	519
<b>Scope of Works</b>	L – Remove extensions and relocate to within the property boundary. M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain;

### 3.2 Lot No. 193 Forrest Crescent



<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Vegetation; Flow path
<b>Description</b>	Dense vegetation impeding flow. Flow path modified, but adequate
<b>Photo ID</b>	390
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 3.3 Lot No. 194 Forrest Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation; Flow path
<b>Description</b>	Dense vegetation impeding flow; Drain modified from fill. Cross sectional capacity is adequate
<b>Photo ID</b>	843
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain; H – Remove fill and reinstate drainage flowpath



### 3.4 Lot No. 195 Forrest Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension Rear access Vegetation
<b>Description</b>	Fence Rear access and modified topography. Semi-dense low lying vegetation
<b>Photo ID</b>	520
<b>Scope of Works</b>	L – Remove fence and relocate to within the drainage reserve; H – Remove rear access and reinstate drainage flow path as defined by the downstream cross-sectional capacity and uniform grade; M – Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 3.5 Lot No. 196 Forrest Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	-
<b>Photo ID</b>	391
<b>Scope of Works</b>	None required.

### 3.6 Lot No. 197 Forrest Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	-
<b>Photo ID</b>	844
<b>Scope of Works</b>	None required.



### 3.7 Lot No. 198 Forrest Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General item
<b>Description</b>	Fenced off garden within drainage reserve.
<b>Photo ID</b>	845
<b>Scope of Works</b>	L - Remove garden and fence.

### 3.8 Lot No. 199 Forrest Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Modified reserve.
<b>Description</b>	Batter encroachment in the form of uncompacted fill extending within the drainage reserve. Rocks impede flow
<b>Photo ID</b>	7343
<b>Scope of Works</b>	M – Reshape batter to stay within the property boundary and compact fill to prevent easy erosion. H – remove rocks and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

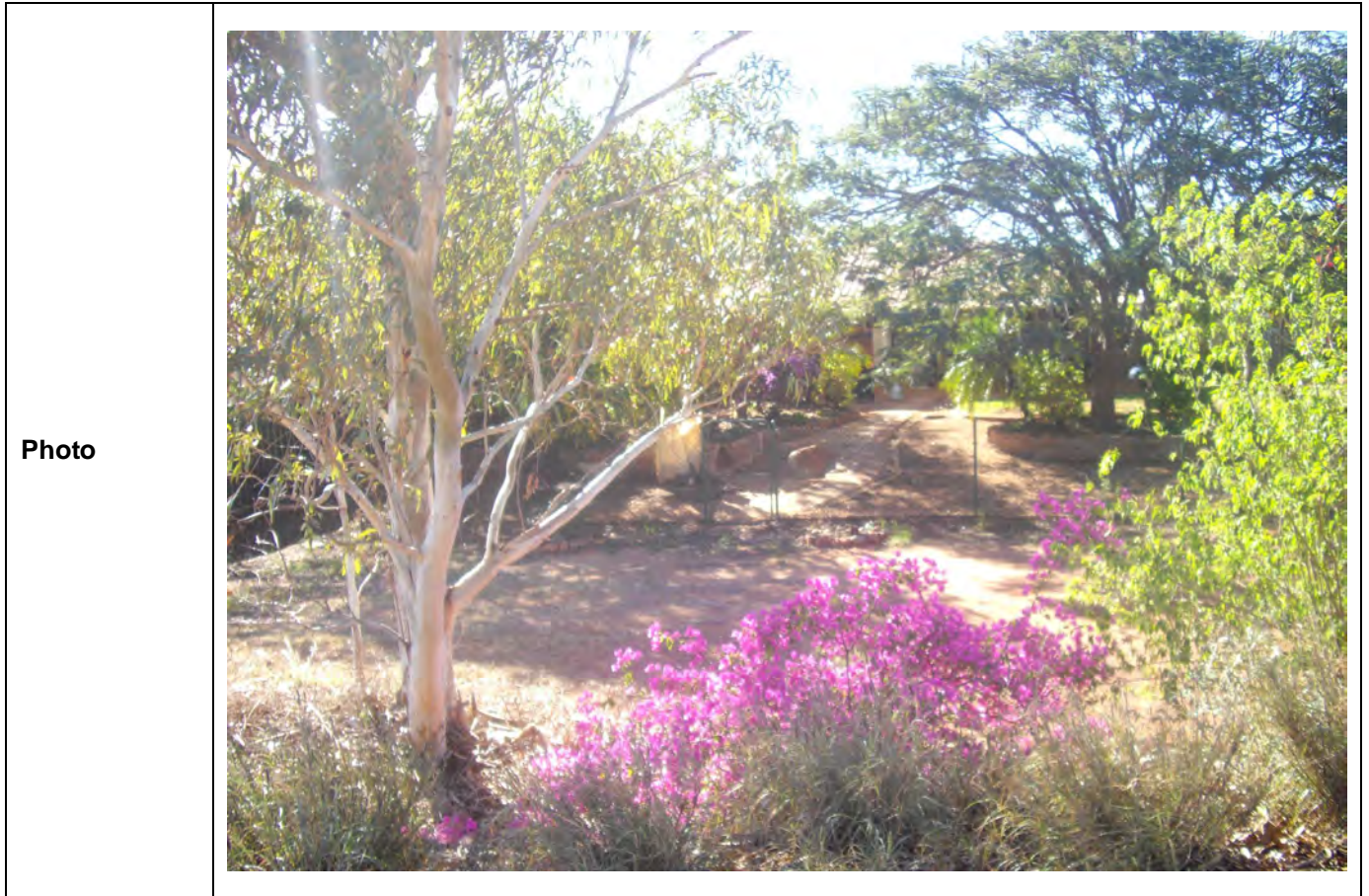
### 3.9 Lot No. 200 Forrest Crescent

<b>Photo</b>	
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<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Very rocky drain with vertical elevation compromising effectiveness and directing flow to within property boundary and inhibiting flow
<b>Photo ID</b>	392
<b>Scope of Works</b>	H – Remove rocks and regrade drainage flow path as defined by the natural capacity and invert of channel of downstream lot



### 3.10 Lot No. 1,200 Forrest Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Flow path adequate
<b>Photo ID</b>	846
<b>Scope of Works</b>	None

### 3.11 Lot No. 2,200 Forrest Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow
<b>Photo ID</b>	521
<b>Scope of Works</b>	H - Remove access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

**3.12 Lot No. 3,200 Forrest Crescent**



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Flow path and capacity adequate
<b>Photo ID</b>	522
<b>Scope of Works</b>	None





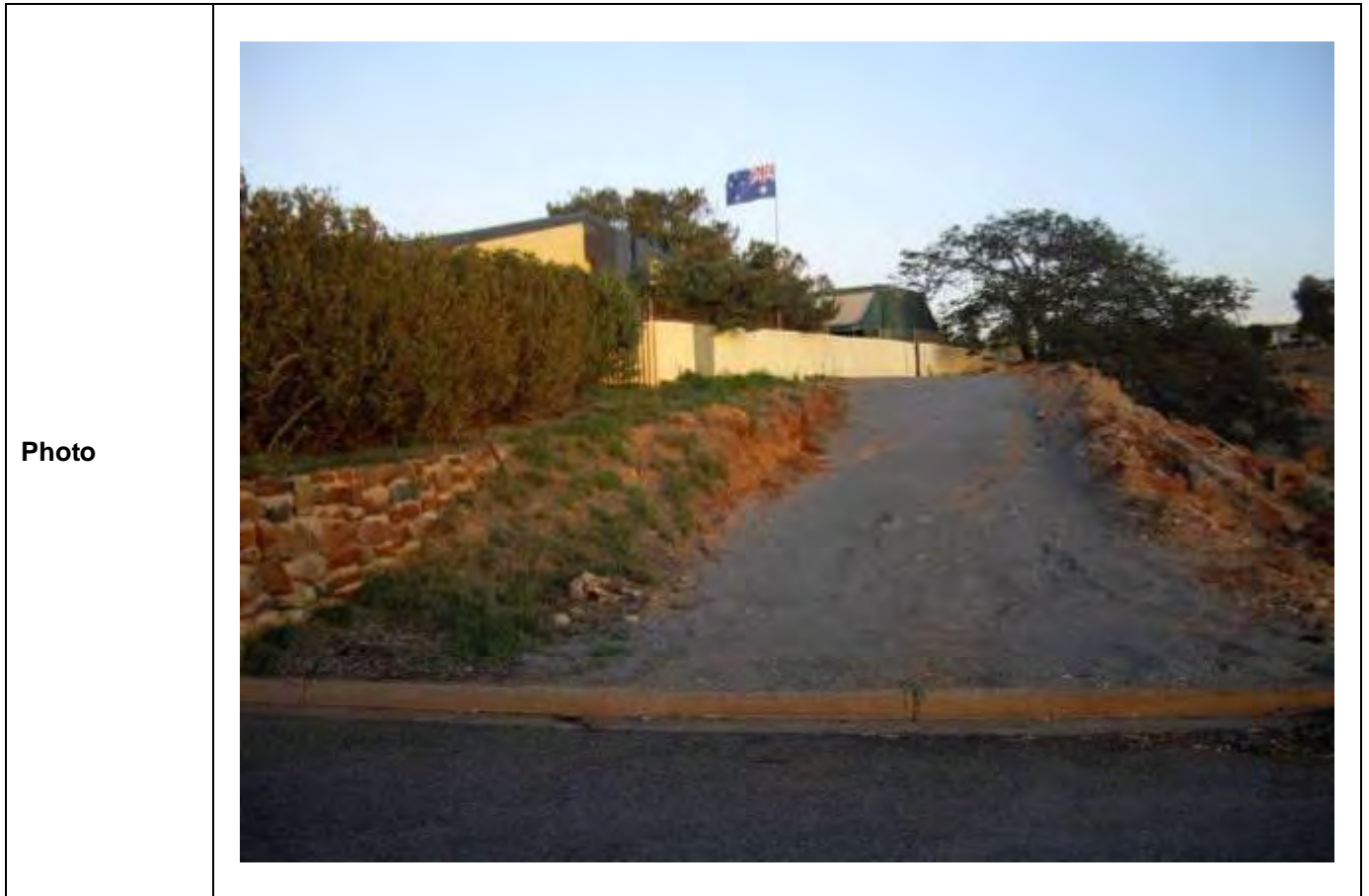
## 4. Roe Crescent (Gregory Crescent lots)

This section refers to the street drainage along Roe Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Gregory Crescent.

Roe Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hampton drive.

The drainage reserve received and conveys flows from the rear half of the Gregory Crescent lots. This discharges in a westerly direction to Hampton Road.

#### 4.1 Lot No. 201 Gregory Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Side access within drainage reserve
<b>Photo ID</b>	687
<b>Scope of Works</b>	L - Remove access

## 4.2 Lot No. 202 Gregory Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access General item
<b>Description</b>	Rear access with culvert impeding flow. Culvert is blocked Boat
<b>Photo ID</b>	7338 – silver fence
<b>Scope of Works</b>	H - Remove access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot L – Remove boat.



### 4.3 Lot No. 203 Gregory Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access with culvert impeding flow. Culvert is blocked;
<b>Photo ID</b>	7338 – green fence
<b>Scope of Works</b>	H - Remove access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

#### 4.4 Lot No. 204 Gregory Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General item – pipe General item - garden
<b>Description</b>	Pipe bridge creating a reduced drainage cross section; Garden within base of drainage reserve.
<b>Photo ID</b>	594
<b>Scope of Works</b>	L – Remove bridge and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot L – Remove garden.

#### 4.5 Lot No. 205 Gregory Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items
<b>Description</b>	Constructed fenced garden in drain base
<b>Photo ID</b>	595
<b>Scope of Works</b>	M - Remove garden



#### 4.6 Lot No. 206 Gregory Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None – flow path and capacity adequate
<b>Photo ID</b>	398
<b>Scope of Works</b>	None required

#### 4.7 Lot No. 207 Gregory Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access and modified topography impede flow Modified reserve due to fill
<b>Photo ID</b>	593
<b>Scope of Works</b>	H - Remove access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

#### 4.8 Lot No. 208 Gregory Crescent



<b>Category</b>	None
<b>Type</b>	
<b>Description</b>	Rock mound between lots 208 and 1208 is catchment divide
<b>Photo ID</b>	833
<b>Scope of Works</b>	None



#### 4.9 Lot No. 1,208 Gregory Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow impedes flow
<b>Photo ID</b>	7335
<b>Scope of Works</b>	H - Remove access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot



## 5. Fremantle Crescent (Roe Crescent lots)

This section refers to the street drainage along Fremantle Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Roe Crescent.

Fremantle Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction into Hampton drive.

The drainage reserve received and conveys flows from the rear half of the Roe Crescent lots. This discharges in a westerly direction to Hampton Road.

**5.1 Lot No. 209 Roe Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Shed
<b>Photo ID</b>	7341
<b>Scope of Works</b>	L - Remove shed extension



## 5.2 Lot No. 210 Roe Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Rocks
<b>Description</b>	Dumped rocks reduce capacity
<b>Rank</b>	-
<b>Photo ID</b>	842
<b>Scope of Works</b>	H – Remove rocks and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

### 5.3 Lot No. 211 Roe Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Filled in rear access sends drainage to road
<b>Rank</b>	H
<b>Photo ID</b>	7340
<b>Scope of Works</b>	H - Remove access way and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

## 5.4 Lot No. 212 Roe Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access General items Modified drainage reserve
<b>Description</b>	Rear access impedes flow Container, trailer Fill material.
<b>Photo ID</b>	7340
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot L – Remove container and trailer



## 5.5 Lot No. 213 Roe Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Rear access Rocks
<b>Description</b>	Rear access and rocks impeding flow
<b>Photo ID</b>	1062
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot M - Remove rock obstructing drain.

## 5.6 Lot No. 214 Roe Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	
<b>Description</b>	Water main reducing cross sectional capacity Flow path adequate
<b>Photo ID</b>	393
<b>Scope of Works</b>	Water main note – no works required



### 5.7 Lot No. 215 Roe Crescent

<b>Photo</b>	
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<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None – drain flow path and capacity adequate
<b>Photo ID</b>	396, 1064
<b>Scope of Works</b>	None required



## 5.8 Lot No. 216 Roe Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None - drain flow path and capacity adequate
<b>Photo ID</b>	396, 1065
<b>Scope of Works</b>	N/A

**5.9 Lot No. 217 Roe Crescent**



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None - drain flow path and capacity adequate
<b>Photo ID</b>	396, 1066
<b>Scope of Works</b>	N/A



## 6. Hill Road (Fremantle Crescent lots)


This section refers to the street drainage along Hill Road and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Fremantle Crescent.

The drainage reserve received and conveys flows from the rear half of the Fremantle Crescent lots. At present the entire drainage reserve along the street drains to a low point immediately behind lot 221. The entire drainage reserve along this street requires re-engineering to either:

- ▶ Grade so discharge south towards and under Hill Road behind lot 221
- ▶ Construct drainage flow path parallel with lots that discharge flow in a westerly direction under Hill road via new culvert



## 6.1 Lot No. 1,218 Fremantle Crescent

<p><b>Photo</b></p>	
<p><b>Category</b></p>	<p>None</p>
<p><b>Type</b></p>	<p>Rear access</p>
<p><b>Description</b></p>	<p>Hard stand area. Overland flow path at this point at the top of the catchment. There is no concentration of flow.</p>
<p><b>Photo ID</b></p>	<p>397</p>
<p><b>Scope of Works</b></p>	<p>None</p>

## 6.2 Lot No. 218 Fremantle Crescent



<b>Category</b>	Drain Maintenance/ Encroachment
<b>Type</b>	Flow path
<b>Description</b>	Flow directed towards lots
<b>Photo ID</b>	1059, 397
<b>Scope of Works</b>	M – Redefine flow path to within drainage reserve.

### 6.3 Lot No. 219 Fremantle Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Flow directed towards lots
<b>Photo ID</b>	1058, 841
<b>Scope of Works</b>	M – Redefine flow path to within drainage reserve.



## 6.4 Lot No. 220 Fremantle Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access and modified topography impedes flow and directs towards lots
<b>Photo ID</b>	592
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

## 6.5 Lot No. 221 Fremantle Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography Receives stormwater runoff from road via kerb break
<b>Photo ID</b>	1056, 592
<b>Scope of Works</b>	L – Remove rear access reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

## 6.6 Lot No. 222 Fremantle Crescent



<b>Category</b>	Drain Maintenance/ Encroachment
<b>Type</b>	Flow path
<b>Description</b>	Flows towards lots
<b>Photo ID</b>	1055, 840
<b>Scope of Works</b>	M – Redefine flow path to within drainage reserve.



## 6.7 Lot No. 223 Fremantle Crescent




<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access over existing water main impeding flow
<b>Photo ID</b>	591
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot

## 6.8 Lot No. 224 Fremantle Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Small cut off drain preventing flow towards lot.
<b>Photo ID</b>	839
<b>Scope of Works</b>	None required.


**6.9 Lot No. 225 Fremantle Crescent**

<p><b>Photo</b></p>	
---------------------	---

<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Modified reserve.
<b>Description</b>	Rear access follows natural topography; Fill.
<b>Photo ID</b>	590
<b>Scope of Works</b>	L – Remove rear access M – Remove fill material and reinstate drainage flow path as defined by the natural capacity and invert of channel of downstream lot



### 6.10 Lot No. 226 Fremantle Crescent


<p><b>Photo</b></p>	
<p><b>Category</b></p>	<p>Encroachment</p>
<p><b>Type</b></p>	<p>Rear access</p>
<p><b>Description</b></p>	<p>Rear access follows natural topography.</p>
<p><b>Photo ID</b></p>	<p>1053, 838</p>
<p><b>Scope of Works</b></p>	<p>L – Remove rear access.</p>



**6.11 Lot No. 1,226 Fremantle Crescent**


<p><b>Photo</b></p>	
<p><b>Category</b></p>	<p>None</p>
<p><b>Type</b></p>	<p>None</p>
<p><b>Description</b></p>	<p>None</p>
<p><b>Photo ID</b></p>	<p>1052, 837</p>
<p><b>Scope of Works</b></p>	<p>None required.</p>

**6.12 Lot No. 2,226 Fremantle Crescent**

<p><b>Photo</b></p>	
<p><b>Category</b></p>	<p>None</p>
<p><b>Type</b></p>	<p>None</p>
<p><b>Description</b></p>	<p>None</p>
<p><b>Photo ID</b></p>	<p>1051, 835</p>
<p><b>Scope of Works</b></p>	<p>None required.</p>



**6.13 Lot No. 3,226 Fremantle Crescent**

<p><b>Photo</b></p>	
<p><b>Category</b></p>	<p>None</p>
<p><b>Type</b></p>	<p>None</p>
<p><b>Description</b></p>	<p>None</p>
<p><b>Photo ID</b></p>	<p>834</p>
<p><b>Scope of Works</b></p>	<p>None required.</p>





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**Document Status**

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	A Dow	M Stovold		G Yandle		20/1/11



CLIENTS | PEOPLE | PERFORMANCE

**Rio Tinto Iron Ore**  
Report on Dampier Drainage  
Review  
Block 5a Encroachments  
June 2010





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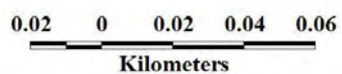


# 1. Block 5a – Encroachments



LEGEND

- Roads
- Cadastre
- Block Boundary
- Encroachment - Low
- Encroachment - Medium
- Encroachment - High



Map Projection: Universal Transverse Mercator  
Horizontal Datum: Geocentric Datum of Australia 1994  
Grid: Map Grid of Australia, Zone 50



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Client Name: RTIO  
Project Name: Dampier Drainage Assessment

## Block 5a Encroachments

Job Number | 6125224  
Revision | A  
Date | 17/08/2010

Figure 1

G:\DIR\JOB\DIR\WORKSPACE\NAME\WOR 239 Adelaide Terrace Perth WA 6004 Australia T 61 8 6222 8222 F 61 8 6222 8555 E permail@ghd.com.au W www.ghd.com.au  
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## 2. Murchison Crescent (Oakover Crescent lots)

This section refers to the street drainage along Murchison Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Oakover Crescent.

Murchison Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction from lot 106 and in an easterly direction from lot 105.

The drainage reserve received and conveys flows from the rear half of the Oakover Crescent lots. This discharges in an easterly direction to the reserve joining Murchison Crescent and Dampier Road.

**2.1 Lot No. 96 Oakover Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Large rock
<b>Description</b>	Drainage reserve flows towards road Rear access - not impeding flow Insitu bed rock not impeding flow
<b>Photo ID</b>	859
<b>Scope of Works</b>	L – Remove rear access

## 2.2 Lot No. 97 Oakover Crescent

<p><b>Photo</b></p>	
---------------------	---

<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access - not impeding flow. Drainage reserve drains towards road which acts as the main drainage flow path.
<b>Photo ID</b>	858
<b>Scope of Works</b>	L - Remove rear access.



### 2.3 Lot No. 98 Oakover Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Vegetation
<b>Description</b>	Backyard extends into drainage reserve but not impeding flow. Road acts as main drainage flow path Lot 99 impedes flow from reserver behind lot 98
<b>Photo ID</b>	631
<b>Scope of Works</b>	L - Remove backyard extension and relocate to within property boundary. H - Reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (99) channel

## 2.4 Lot No. 99 Oakover Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; General items.
<b>Description</b>	Rear access driveway impedes flow from lot 98. Boat
<b>Photo ID</b>	630
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (100) channel L – Remove boat.

## 2.5 Lot No. 100 Oakover Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impedes flow from lots 98 and 99
<b>Photo ID</b>	629
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (101) channel to flow east



## 2.6 Lot No. 101 Oakover Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impedes flow from lots 98, 99 and 100 Road acts as the main stormwater conveyor.
<b>Photo ID</b>	628
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (1101) channel to flow east

## 2.7 Lot No. 1,101 Oakover Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impedes flow from lots 98, 99, 100 and 101
<b>Photo ID</b>	627
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (east of 1101) channel



### 3. Lyndon Crescent (Murchison Crescent lots)

This section refers to the street drainage along Lyndon Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Murchison Crescent.

Lyndon Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Murchison Crescent lots. This discharges in a westerly direction to the reserve joining Murchison Crescent and West Avenue.



### 3.1 Lot No. 102 Murchinson Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation; General item.
<b>Description</b>	Low lying semi-dense vegetation; Vehicle inspection ramps.
<b>Photo ID</b>	847
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain L – Remove vehicle inspection ramp.

### 3.2 Lot No. 103 Murchinson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Fill
<b>Description</b>	Fence and property has extended to within the drainage reserve. Top of catchment No drainage reserve - road reserve acts as the main stormwater conveyer.
<b>Photo ID</b>	605
<b>Scope of Works</b>	L – Remove fence and reinstate property boundary. Reinstate drainage reserve to grade to the east or to the road reserve. M – Remove fill.

### 3.3 Lot No. 104 Murchinson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Boundary extension.
<b>Description</b>	Rear access and modified topography; Drainage reserve has area of fill. (Drainage reserve is higher than the road reserve). Fence is misaligned with the property boundary.
<b>Photo ID</b>	606
<b>Scope of Works</b>	L - Remove rear access H - Remove fill area and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (105) channel.

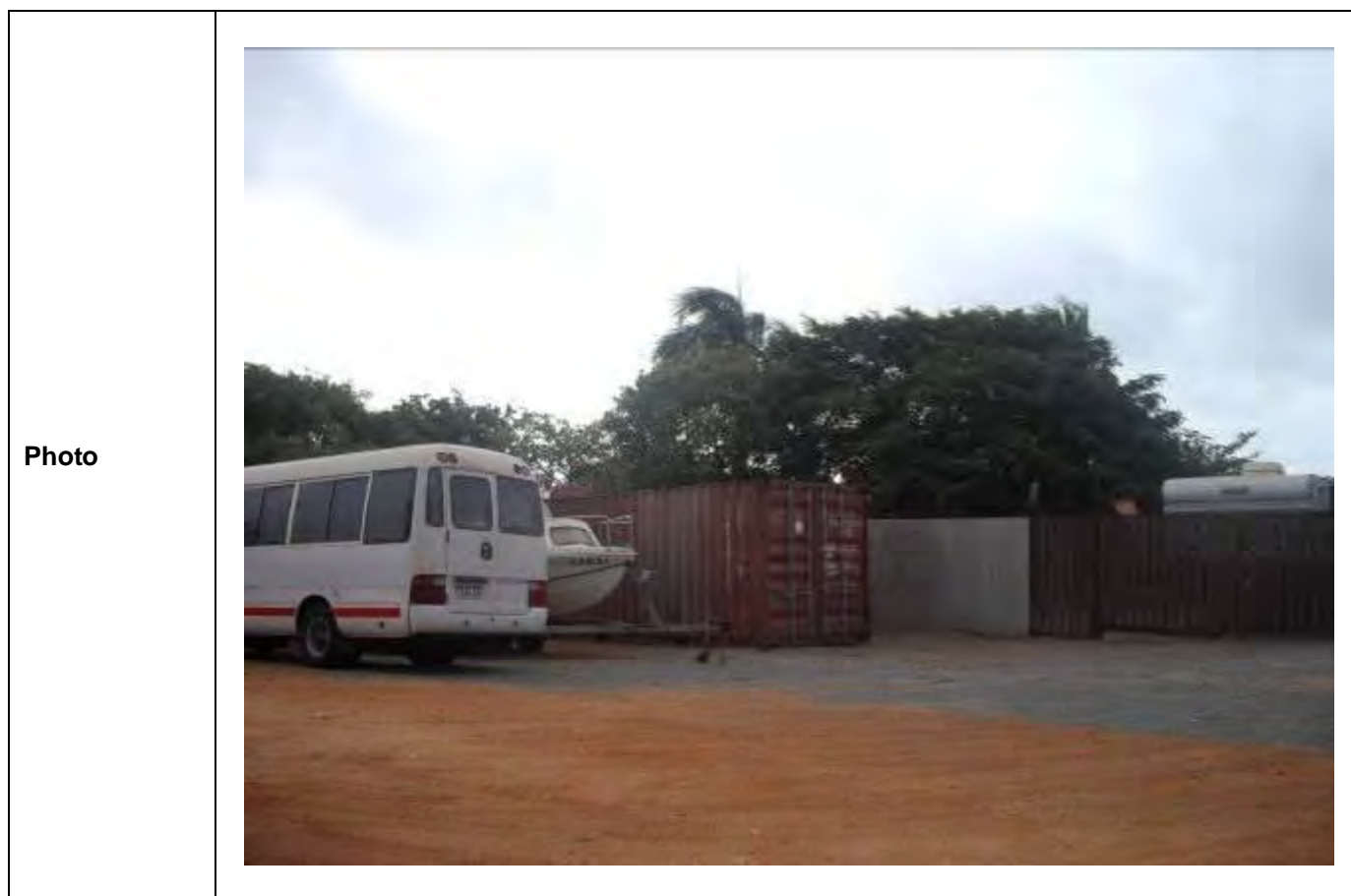


### 3.4 Lot No. 105 Murchinson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Modified drainage reserve; General items.
<b>Description</b>	Original intended design not apparent due to high level of modification. Drainage reserve is being used as a parking area. Road reserve acts as the main stormwater conveyor. Vehicles.
<b>Photo ID</b>	607
<b>Scope of Works</b>	L - Remove fill and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (106) channel. L – Remove vehicles.

### 3.5 Lot No. 106 Murchinson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items
<b>Description</b>	Sea container, bus, boat
<b>Photo ID</b>	608
<b>Scope of Works</b>	M - Remove items M - Reinststate drainage flow path as defined by the natural capacity and invert of downstream lot (107) channel

### 3.6 Lot No. 107 Murchinson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impedes flow, but drain ok
<b>Photo ID</b>	609
<b>Scope of Works</b>	H - Remove access driveway and reinstate drain



### 3.7 Lot No. 108 Murchinson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access driveway with inadequate culverts and rock wall
<b>Photo ID</b>	610
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (109) channel

### 3.8 Lot No. 109 Murchinson Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access following natural contours – with small impediment to flow Fill material has been imported
<b>Photo ID</b>	611
<b>Scope of Works</b>	L - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (1109) channel H – Remove fill material

### 3.9 Lot No. 1,109 Murchinson Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None
<b>Photo ID</b>	400
<b>Scope of Works</b>	None required.





## 4. Irwin Crescent (Lyndon Crescent lots)

This section refers to the street drainage along Irwin Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Lyndon Crescent.

Irwin Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Lyndon Crescent lots. This discharges in a westerly direction from lot 115 and an easterly direction from lot 116.

#### 4.1 Lot No. 110 Lyndon Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Fence Vegetation
<b>Description</b>	Fence within drainage reserve Heavy vegetation
<b>Photo ID</b>	855
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain M – Remove fence

## 4.2 Lot No. 111 Lyndon Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography. Flow is easily directed towards lots.
<b>Photo ID</b>	854
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (110) channel



### 4.3 Lot No. 112 Lyndon Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access No defined flow path Vegetation
<b>Description</b>	Rear access contributes to flow entering property; Dense vegetation impeding flow.
<b>Photo ID</b>	857
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (111) channel H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

#### 4.4 Lot No. 113 Lyndon Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Modified drainage reserve
<b>Description</b>	Rear access has culvert Collection of rocks but channel adequate
<b>Photo ID</b>	626
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (114) channel L – Remove rocks from the “channel”.

#### 4.5 Lot No. 114 Lyndon Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Modified flow path Vegetation
<b>Description</b>	Rear access and modified topography Flow of water is directed towards the property.
<b>Photo ID</b>	625
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (113) channel M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



#### 4.6 Lot No. 115 Lyndon Crescent

<b>Photo</b>	
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<b>Category</b>	Encroachment
<b>Type</b>	Rear access Modified drainage flow path
<b>Description</b>	Rear access impeding flow Large rocks
<b>Photo ID</b>	7309
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (114) channel M - Large rocks to be re-landscaped to allow flow.

#### 4.7 Lot No. 116 Lyndon Crescent



<b>Category</b>	Encroachment/ Drain Maintenance
<b>Type</b>	Rear access Boundary extension Vegetation
<b>Description</b>	Top of catchment Rear access and modified topography Flow path is not defined due to extensive modifications to drainage reserve Fence is within the drainage reserve Semi-dense vegetation at downstream side of lot
<b>Photo ID</b>	624
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (1116) channel L - Remove fence and relocate to within the property boundary – confirmation required from survey M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

#### 4.8 Lot No. 1,116 Lyndon Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation
<b>Photo ID</b>	403
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



#### 4.9 Lot No. 2,116 Lyndon Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access General items
<b>Description</b>	Rear access follows natural topography Vehicle
<b>Photo ID</b>	1074 ,853
<b>Scope of Works</b>	L – Remove rear access L – Remove vehicle

#### 4.10 Lot No. 3,116 Lyndon Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None
<b>Photo ID</b>	1073
<b>Scope of Works</b>	None required.



## 5. Meda Crescent (Irwin Crescent lots)

This section refers to the street drainage along Meda Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Irwin Crescent.

Meda Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Irwin Crescent lots. This discharges in a westerly direction from lot 120 and an easterly direction from lot 119.

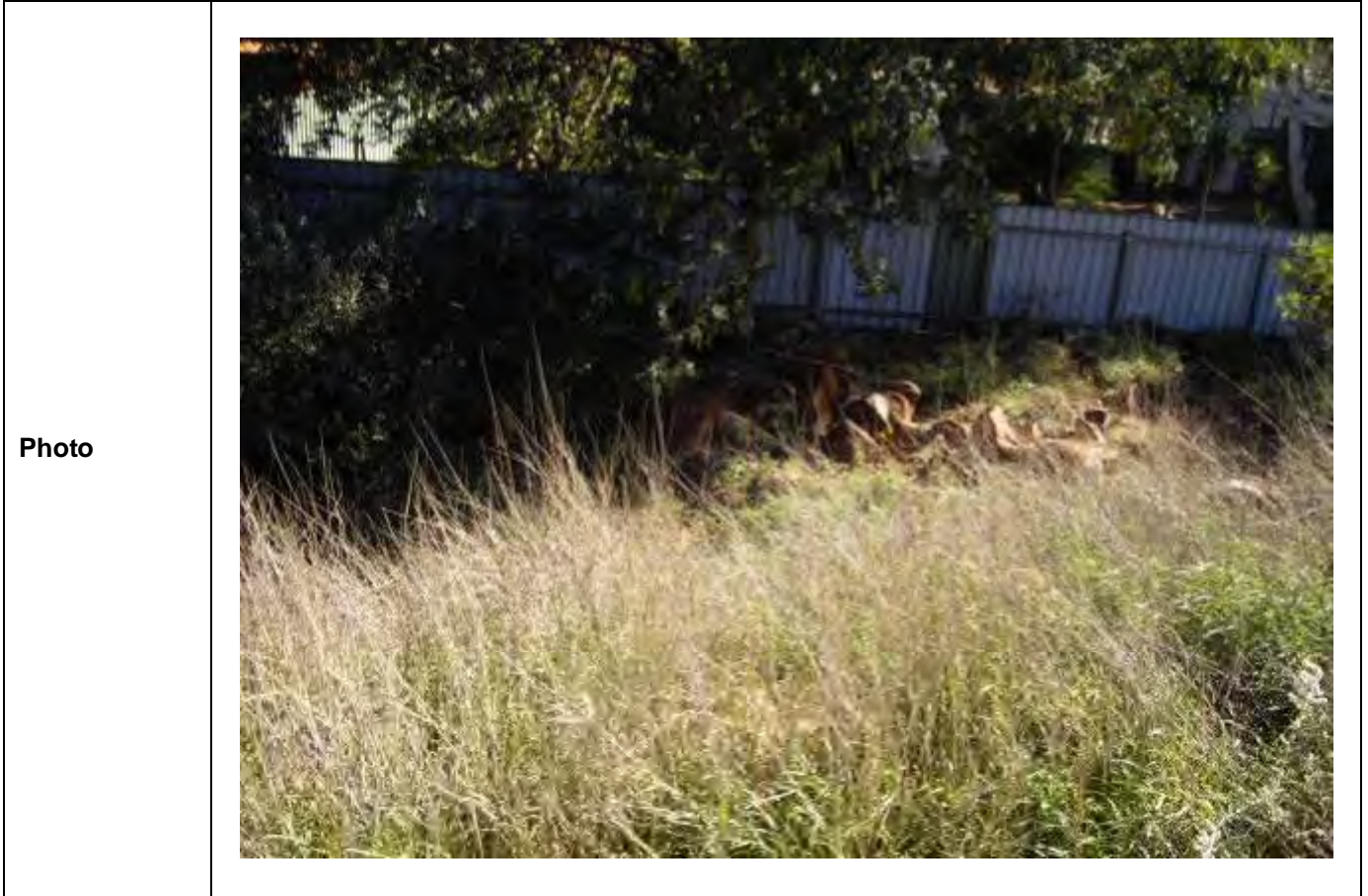


**5.1 Lot No. 117 Irwin Crescent**



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Overland flow directed to the East.
<b>Photo ID</b>	848
<b>Scope of Works</b>	None required.

**5.2 Lot No. 118 Irwin Crescent**



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Overland flow is directed towards to the East.
<b>Photo ID</b>	849
<b>Scope of Works</b>	None required.

### 5.3 Lot No. 119 Irwin Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	Top of catchment Overland flow is directed towards the East
<b>Photo ID</b>	850
<b>Scope of Works</b>	None required.



#### 5.4 Lot No. 120 Irwin Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Boundary extension Vegetation
<b>Description</b>	Old fence Semi dense vegetation
<b>Photo ID</b>	612
<b>Scope of Works</b>	L – Remove fence – confirmation required from survey M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 5.5 Lot No. 121 Irwin Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Fence – does not impact flow. Channel adequate
<b>Photo ID</b>	613
<b>Scope of Works</b>	L – Remove fence – get confirmation from survey

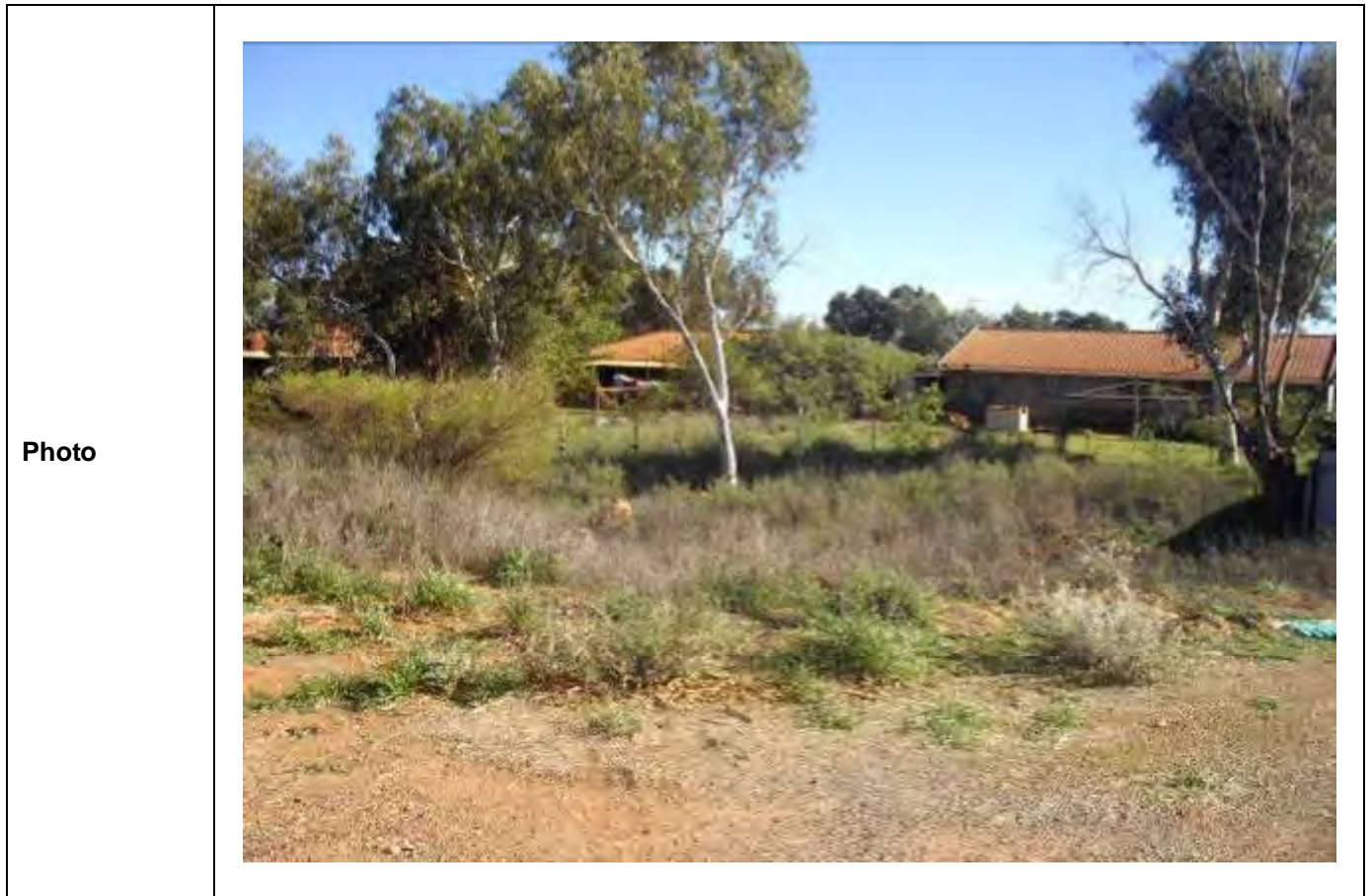
**5.6 Lot No. 122 Irwin Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access with culvert
<b>Photo ID</b>	614
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (123) channel



## 5.7 Lot No. 123 Irwin Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense low lying vegetation
<b>Photo ID</b>	851
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

**5.8 Lot No. 124 Irwin Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Ill defined.
<b>Description</b>	Rear access follows natural topography. Flow is directed towards lots.
<b>Photo ID</b>	615
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (1,124) channel and within the drainage reserve.

**5.9 Lot No. 1,124 Irwin Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access and modified topography.
<b>Photo ID</b>	1070
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (2,124) channel



**5.10 Lot No. 2,124 Irwin Crescent**



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None
<b>Photo ID</b>	1071
<b>Scope of Works</b>	None required



## 6. Namatjira Road (Meda Crescent lots)

This section refers to the street drainage along Namatjira Road and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Meda Crescent.

Namatjira Road receives and conveys flow water that falls on it plus East Avenue. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Meda Crescent lots. This discharges in a westerly direction.

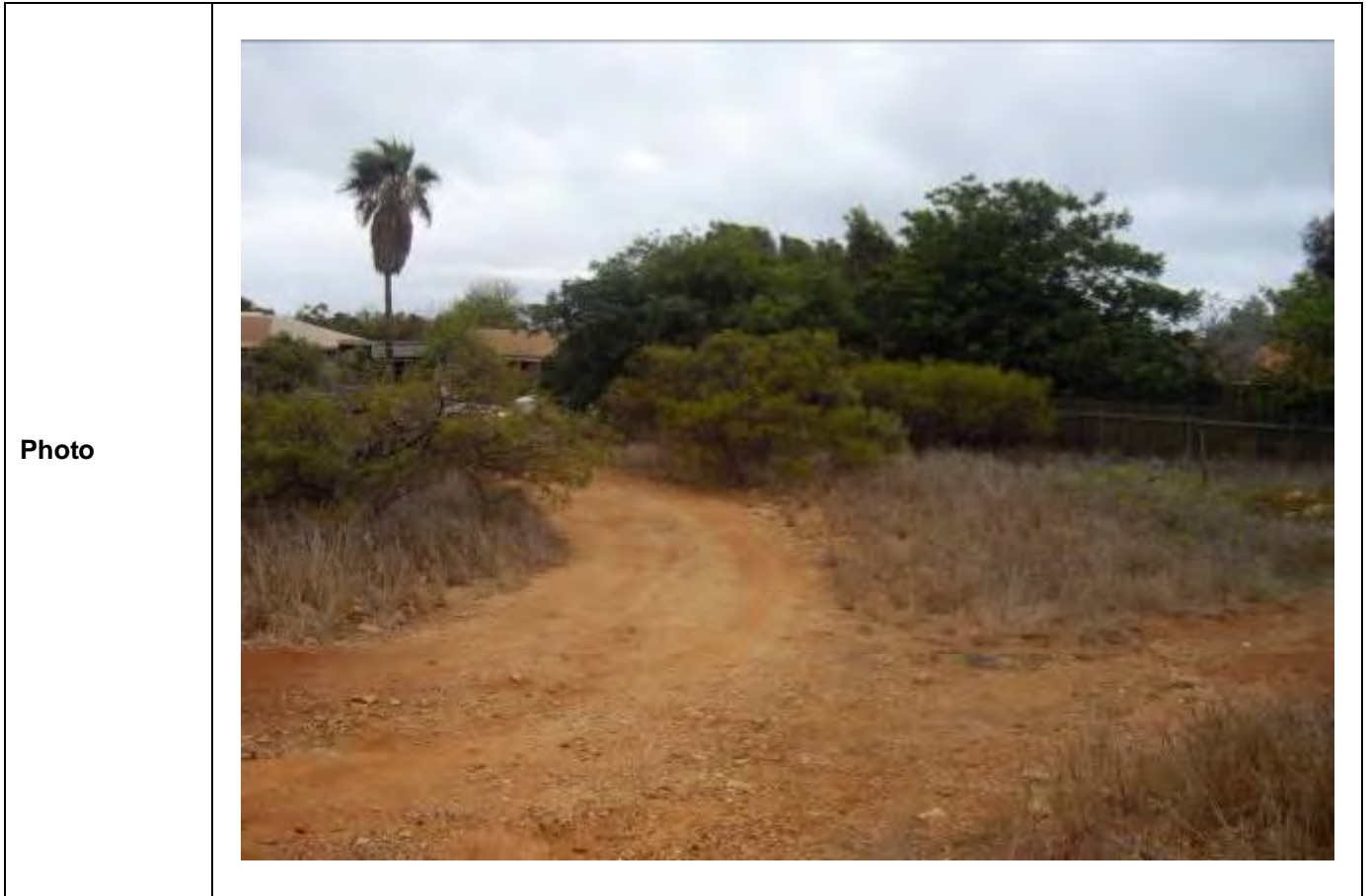
## 6.1 Lot No. 125 Meda Crescent



<b>Category</b>	Encroachment/ Drain Maintenance
<b>Type</b>	Rear access General item Boundary Encroachment Modified drain
<b>Description</b>	Rear access impedes flow Trailer not impeding flow Landscaping including retaining wall not impeding flow
<b>Photo ID</b>	623
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream channel L – Remove trailer L – Remove landscaping



## 6.2 Lot No. 126 Meda Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Modified flow path
<b>Description</b>	Rear access follows natural topography
<b>Photo ID</b>	622
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (125) channel

### 6.3 Lot No. 127 Meda Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access and modified topography
<b>Photo ID</b>	621
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (126) channel

#### 6.4 Lot No. 128 Meda Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access and modified topography impedes flow
<b>Photo ID</b>	620
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (127) channel



## 6.5 Lot No. 129 Meda Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Modified flow path
<b>Description</b>	Rear access follows natural topography Drainage reserve is lower than the road reserve but slopes towards the property.
<b>Photo ID</b>	619
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (128) channel

## 6.6 Lot No. 130 Meda Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access General items.
<b>Description</b>	Rear access impedes flow Building material and vehicle parts
<b>Photo ID</b>	618
<b>Scope of Works</b>	H - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (129) channel L – Remove building material and vehicle parts.

## 6.7 Lot No. 131 Meda Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography
<b>Photo ID</b>	617
<b>Scope of Works</b>	L – Remove rear access



## 6.8 Lot No. 1,131 Meda Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography
<b>Photo ID</b>	616
<b>Scope of Works</b>	L – Remove rear access

**6.9 Lot No. 2,131 Meda Crescent**



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Top of catchment flow path adequate.
<b>Photo ID</b>	852
<b>Scope of Works</b>	None required.





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		Name	Signature	Name	Signature	Date
A	A Dow	M Stovold		G Yandle		20/1/11





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**Rio Tinto Iron Ore**  
Report on Dampier Drainage  
Review  
Block 5b Encroachments  
June 2010



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# 1. Block 5b – Encroachments



LEGEND

- Roads
- Cadastre
- Block Boundary
- Encroachment - Low
- Encroachment - Medium
- Encroachment - High

<p>0.01 0 0.01 0.02 0.03 Kilometers</p> <p>Map Projection: Universal Transverse Mercator Horizontal Datum: Geocentric Datum of Australia 1994 Grid: Map Grid of Australia, Zone 50</p>		<p>CLIENTS   PEOPLE   PERFORMANCE</p>		<p>Client Name: RTIO Project Name: Dampier Drainage Assessment <b>Block 5b Encroachments</b></p>	<p>Job Number: 6125224 Revision: A Date: 17/08/2010</p>
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Figure 1

G:\DIR\JOB\DIR\WORKSPACE\NAME.WOR  
© 2010. Whilst every care has been taken to prepare this map, GHD (and DATA CUSTODIAN) make no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and cannot accept liability and responsibility of any kind (whether in contract, tort or otherwise) for any expenses, losses, damages and/or costs (including indirect or consequential damage) which are or may be incurred by any party as a result of the map being inaccurate, incomplete or unsuitable in any way and for any reason.  
Data source: Data Custodian, Data Set Name/Title, Version/Date. Created by:







## 2. Flinders Crescent (Burke Crescent lots)

This section refers to the street drainage along Flinders Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Burke Crescent.

Flinders Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Burke Crescent lots. This discharges in a westerly direction to the reserve joining West Avenue.

The drainage reserve flow path is impeded from lot 2,160 through to lot 156. A defined channel and flow path is required to be constructed that commences at the invert of the natural drainage reserve west of lot 2,160 to match into the channel at lot 1,156.



**2.1 Lot No. 3,156 Burke Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Landscaping on corner boundary Reserve flows to the east
<b>Photo ID</b>	638
<b>Scope of Works</b>	L - Remove landscaping to within property boundary.

## 2.2 Lot No. 2,156 Burke Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow
<b>Photo ID</b>	1079
<b>Scope of Works</b>	H – Remove rear access and reinstate to natural topography

### 2.3 Lot No. 1,156 Burke Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access at top of catchment
<b>Photo ID</b>	635
<b>Scope of Works</b>	M - Remove rear access and reinstate to natural topography

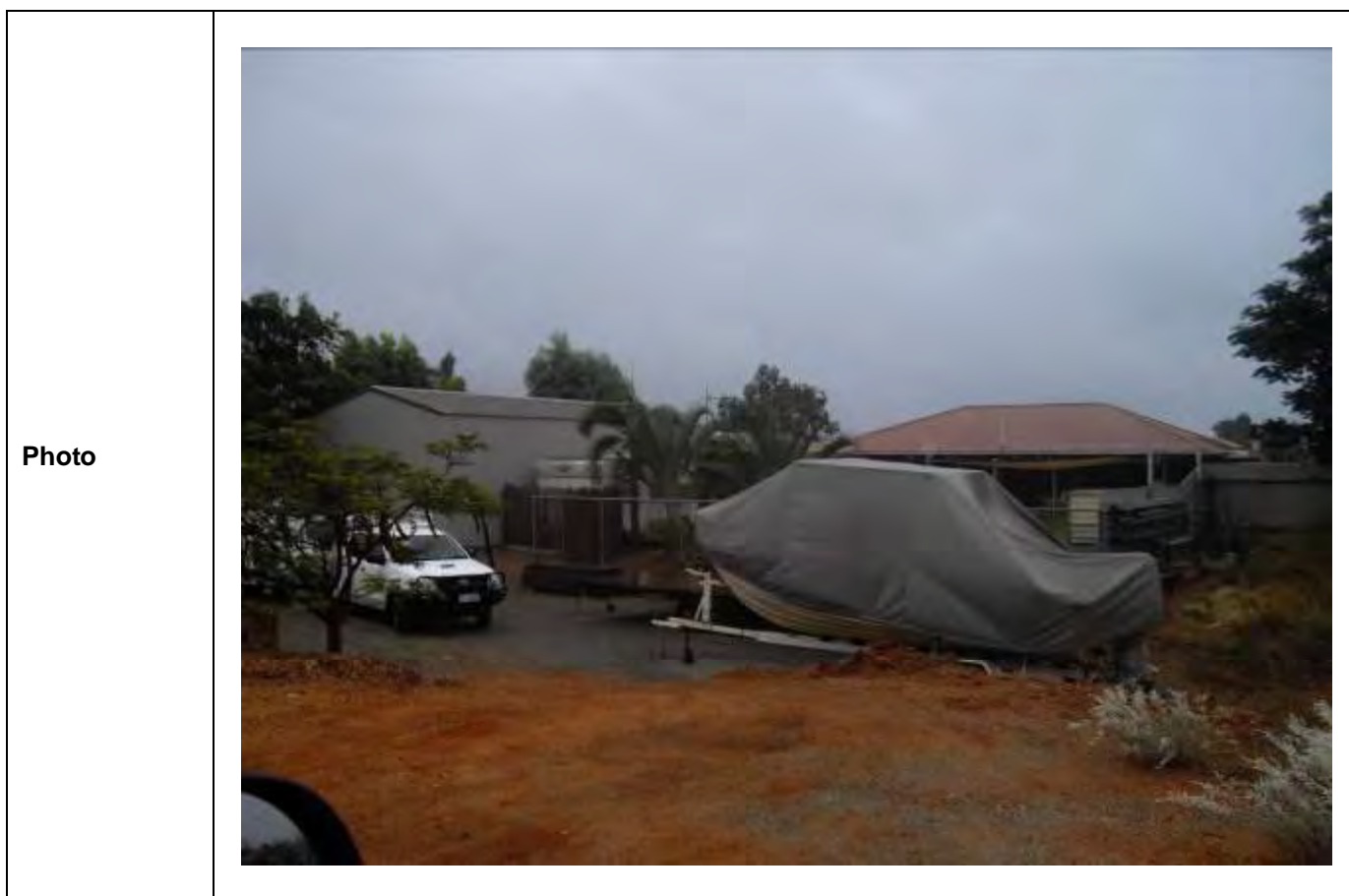


## 2.4 Lot No. 156 Burke Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Vegetation General items
<b>Description</b>	Vegetation not impeding flow Barrels not impeding flow
<b>Photo ID</b>	874
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain L – Remove barrels

## 2.5 Lot No. 157 Burke Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Flow path - modified Boundary extension General items
<b>Description</b>	Imported blue metal used for storage area and rear access follows natural topography Road level is extended out within the drainage reserve reducing cross-sectional capacity Boat and vehicles
<b>Photo ID</b>	636
<b>Scope of Works</b>	L – Remove blue metal and rear access M - Remove fill material and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (158) channel L – Remove boat and vehicles

## 2.6 Lot No. 158 Burke Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense low lying vegetation
<b>Photo ID</b>	875
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 2.7 Lot No. 159 Burke Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Modified drainage reserve
<b>Description</b>	Rear access and modified topography Fill material
<b>Photo ID</b>	637
<b>Scope of Works</b>	M - Remove access driveway H – Remove fill material and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (160) channel.

## 2.8 Lot No. 160 Burke Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	No defined flow path due to fill
<b>Photo ID</b>	876
<b>Scope of Works</b>	M – Remove fill and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (1,160) channel

## 2.9 Lot No. 1,160 Burke Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Modified drainage reserve Rear access
<b>Description</b>	Property and landscaping extends into the drainage reserve Modified drainage reserve due to large amounts of fill which impedes flow ( it is assumed here that part of the flow is to be directed west and partly to go through the culvert situated on lot 159) Rear and follows the modified topography
<b>Photo ID</b>	7314
<b>Scope of Works</b>	H - Remove backyard extension to within property boundary. H – Remove fill and rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (2,610) channel



## 2.10 Lot No. 2,160 Burke Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Modified drainage reserve Rear access General items
<b>Description</b>	Property and landscaping extends into the drainage reserve Modified drainage reserve due to large amounts of fill which impedes flow ( it is assumed here that part of the flow is to be directed west and partly to go through the culvert situated on lot 159) Rear access and modified topography Trailer and building materials
<b>Photo ID</b>	7315
<b>Scope of Works</b>	M – Remove landscaping; H – Remove fill and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (west of 2,160) channel L – Remove trailer and building materials.



### 3. Warburton Crescent (Flinders Crescent lots)

This section refers to the street drainage along Warburton Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Flinders Crescent.

Warburton Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Flinders Crescent lots and drains in a westerly direction.

### 3.1 Lot No. 161 Flinders Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Boundary extension Flow path
<b>Description</b>	Shed Drainage flow path low point is within the property boundary
<b>Photo ID</b>	633
<b>Scope of Works</b>	H - Remove shed – confirmation required from survey M – Redefine drainage flow path to be contained within the drainage reserve and match downstream channel. Confirmation from survey. If encroaching, remove boundary extension to within property boundary; M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



### 3.2 Lot No. 162 Flinders Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General item Flow path.
<b>Description</b>	Trailer; Note road embankment encroaches on drainage reserve
<b>Photo ID</b>	634
<b>Scope of Works</b>	M - Remove trailer H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 3.3 Lot No. 163 Flinders Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None – drain adequate
<b>Photo ID</b>	867
<b>Scope of Works</b>	N/A

### 3.4 Lot No. 164 Flinders Crescent



<b>Category</b>	Drain maintenace
<b>Type</b>	Vegetation
<b>Description</b>	None – drain adequate
<b>Photo ID</b>	866
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



### 3.5 Lot No. 165 Flinders Crescent



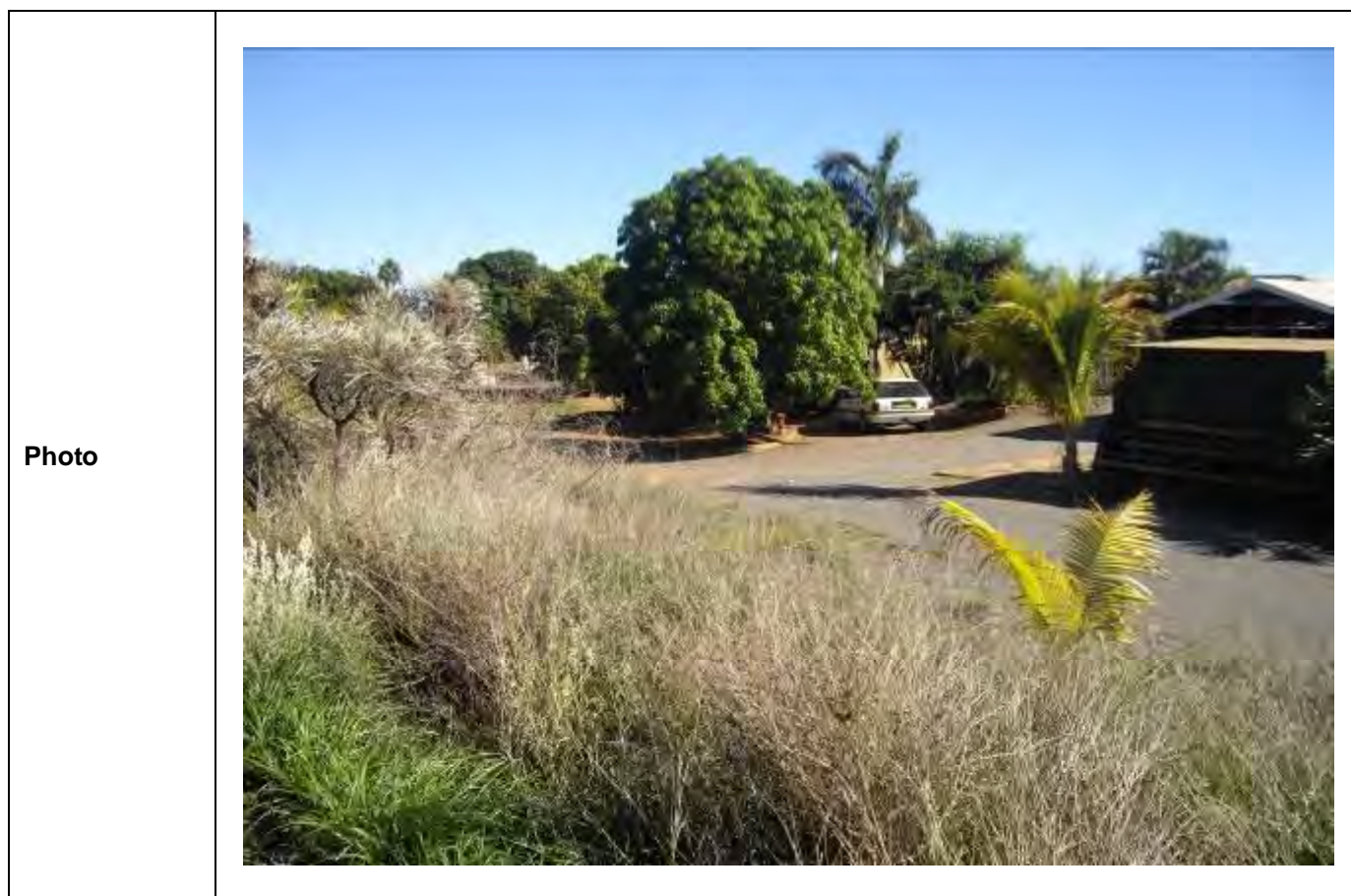
<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography.
<b>Photo ID</b>	865
<b>Scope of Works</b>	L - Remove access driveway

### 3.6 Lot No. 166 Flinders Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Boundary extension
<b>Description</b>	Rear access follows natural topography Batter encroachment within the drainage reserve – drain flow path is adequate
<b>Photo ID</b>	864
<b>Scope of Works</b>	L - Remove access driveway; M - Remove batter – confirmation required from survey.

### 3.7 Lot No. 167 Flinders Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography
<b>Photo ID</b>	863
<b>Scope of Works</b>	L – Remove rear acces and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (166) channel



### 3.8 Lot No. 168 Flinders Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography.
<b>Photo ID</b>	862
<b>Scope of Works</b>	L - Remove access driveway and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (west of 167) channel

### 3.9 Lot No. 169 Flinders Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense vegetation
<b>Photo ID</b>	7318
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 3.10 Lot No. 1,169 Flinders Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Flow path Rear access Side access Vegetation
<b>Description</b>	No drainage flow path due to extensive modifications to drainage reserve Rear access and modified topography Side access follows natural topography with some impediment to flow
<b>Photo ID</b>	861
<b>Scope of Works</b>	H – Remove fill material and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (169) channel. M – Remove rear access M – Remove side access M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain





## 4. Thyssen Crescent (Warburton Crescent lots)

This section refers to the street drainage along Thyssen Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Warburton Crescent.

Thyssen Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

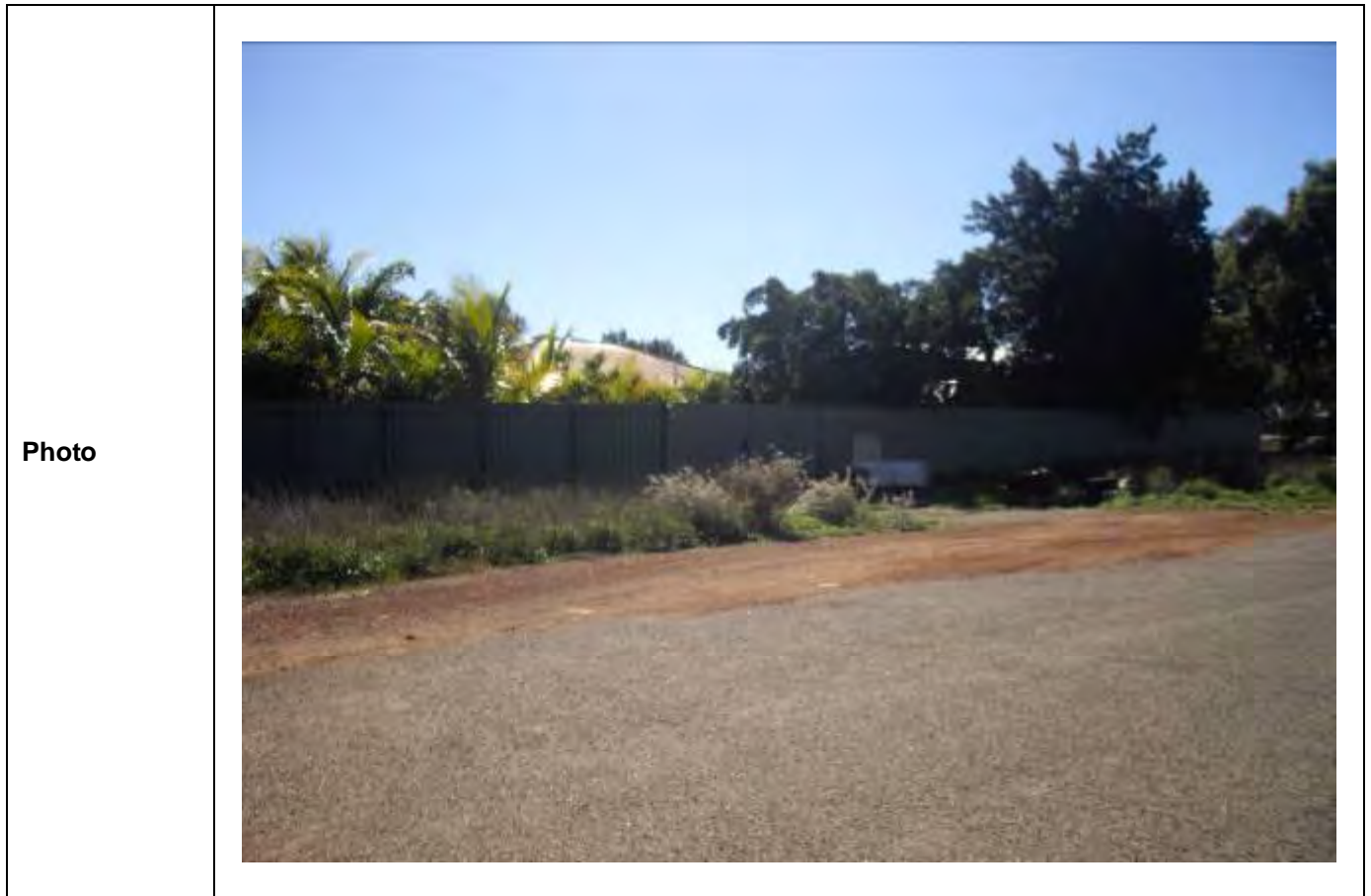
The drainage reserve received and conveys flows from the rear half of the Warburton Crescent lots. It drains in a westerly direction from lot 172 and east from lot 171.

#### 4.1 Lot No. 1,170 Warburton Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense low lying vegetation
<b>Photo ID</b>	868
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

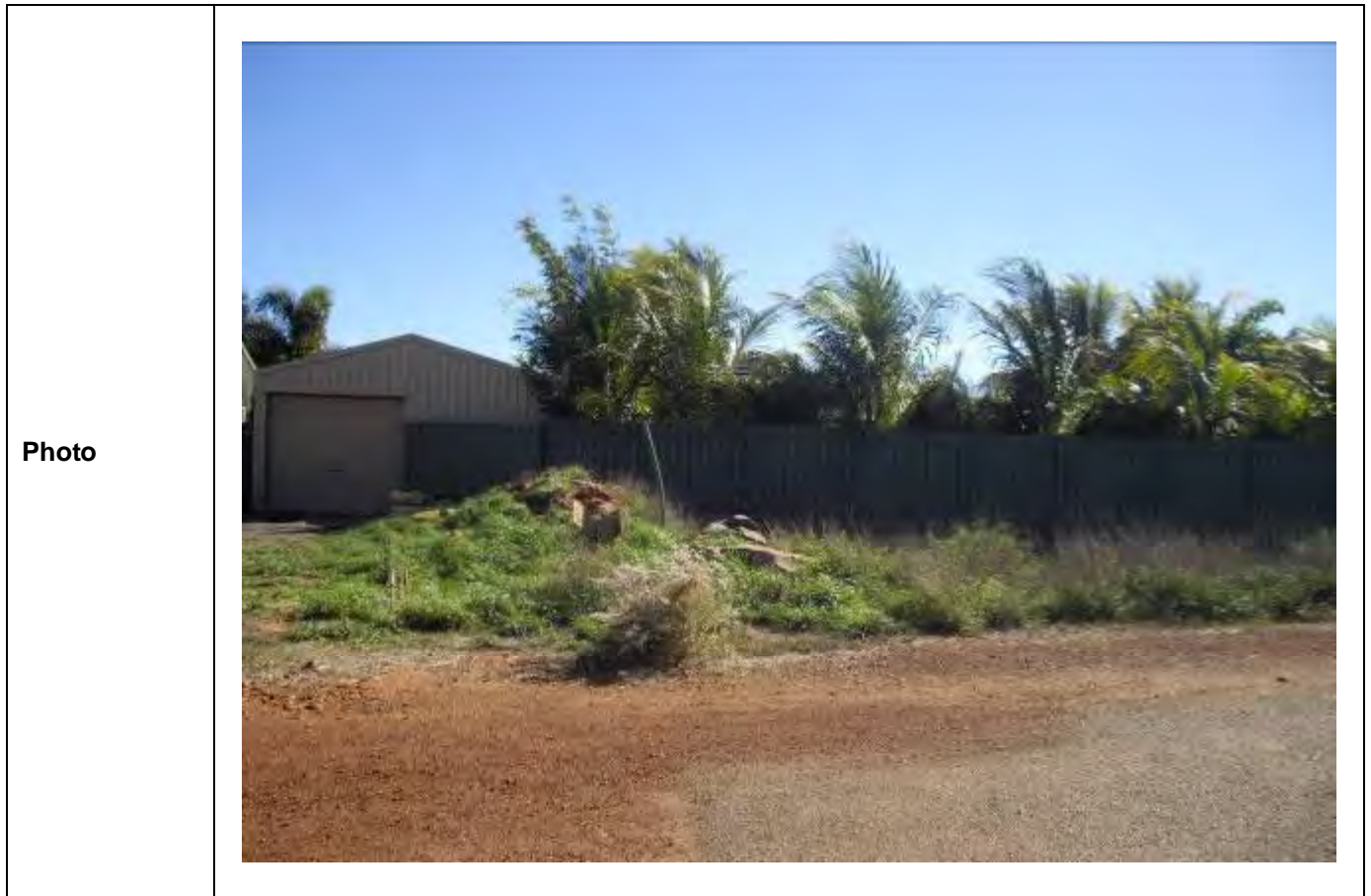
## 4.2 Lot No. 170 Warburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Flowpath
<b>Description</b>	Rear access follows natural topography Drainage flowpath within reserve flows towards the property although it should not be large flow
<b>Photo ID</b>	871
<b>Scope of Works</b>	L - Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (east 170) channel

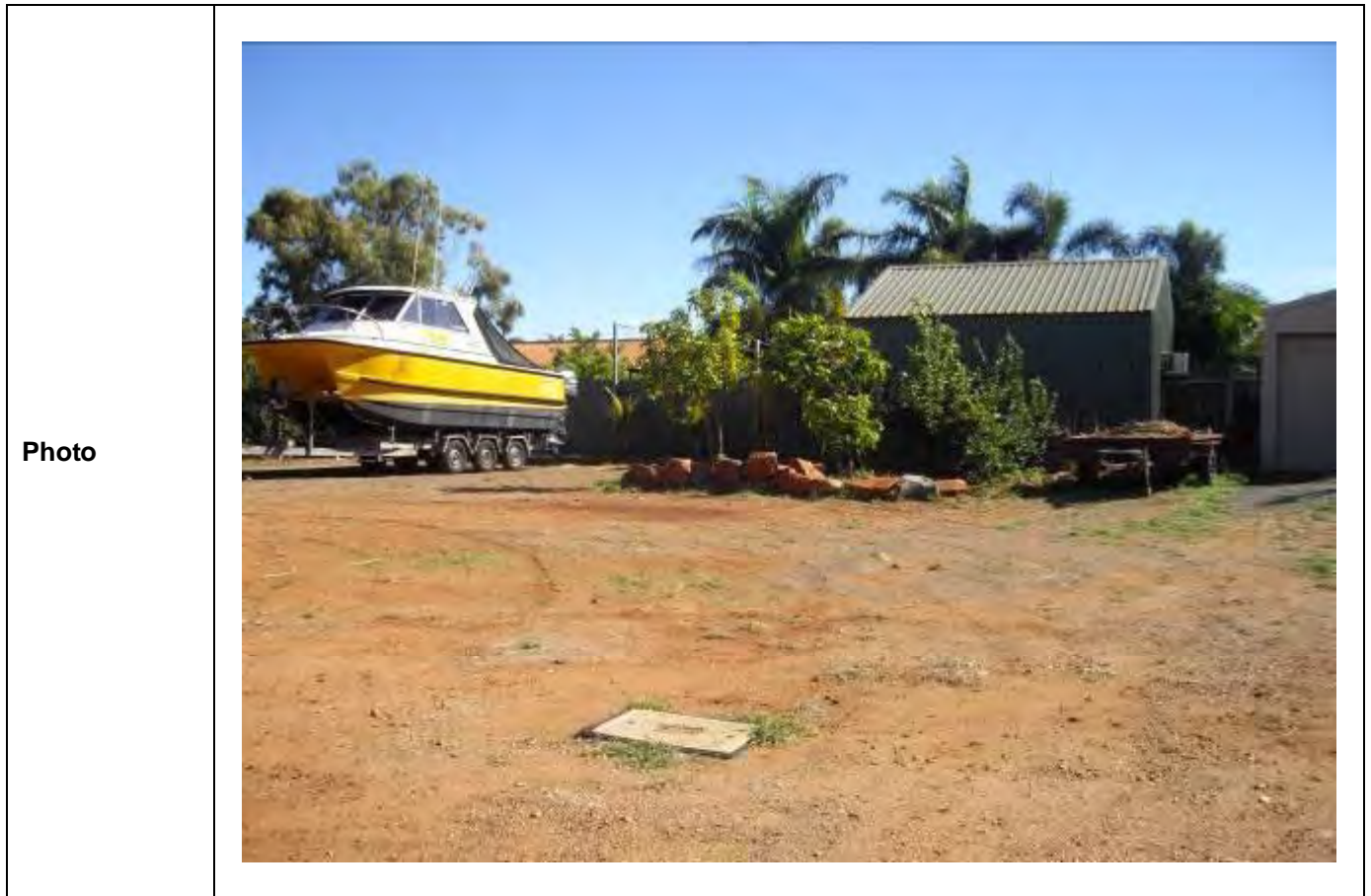


### 4.3 Lot No. 171 Warburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Boundary extension Fill
<b>Description</b>	Top of catchment Rear access and modified topography Shed is within the drainage reserve Fill material dumped in drainage reserve
<b>Photo ID</b>	872
<b>Scope of Works</b>	M - Remove access driveway L – Remove shed – confirmation required from survey H - Remove fill material and reinstate drainage flow path to the east

#### 4.4 Lot No. 172 Warburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access No defined flow path
<b>Description</b>	Rear access follows modified topography Flow path has been extensively modified due to many changes
<b>Photo ID</b>	873
<b>Scope of Works</b>	H – Remove rear access reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (173) channel.

#### 4.5 Lot No. 173 Warburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access Flow path
<b>Description</b>	Rear access follows modified topography Drainage flow path is not defined and natural flow is towards the property Fill dumped in drainage reserve
<b>Photo ID</b>	1076, 405
<b>Scope of Works</b>	H – Remove rear access reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (174) channel. M – Remove fill

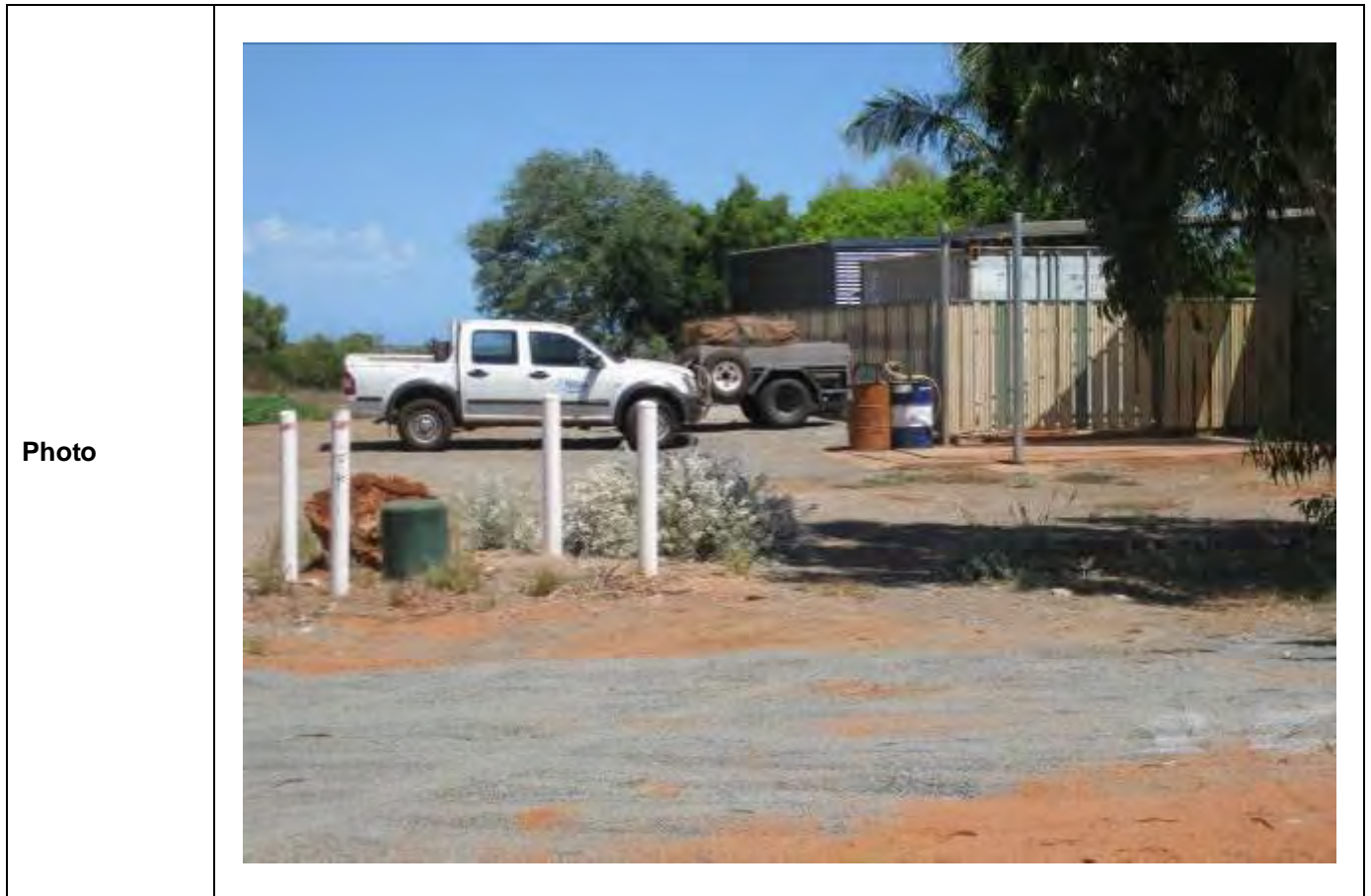


#### 4.6 Lot No. 174 Warburton Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access Vegetation
<b>Description</b>	Rear access follows natural topography Semi-dense vegetation Sump in drainage reserve
<b>Photo ID</b>	1077
<b>Scope of Works</b>	L – Remove rear access and reinstatate to natural topography H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain M – clean out sump and check pipework

#### 4.7 Lot No. 1 Warburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Rear access Flow path
<b>Description</b>	Fence is within the drainage reserve Rear access follows natural/modified topography Drainage flow path has been extensively modified
<b>Photo ID</b>	7317
<b>Scope of Works</b>	L – Remove fence – get confirmation from survey; M – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (2) channel.

#### 4.8 Lot No. 2 Warburton Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Rear access General items
<b>Description</b>	Property has been extended to within the drainage reserve Rear access follows modified topography Boat, vehicles, building equipment
<b>Photo ID</b>	7316
<b>Scope of Works</b>	H – Remove property extensions and relocate to within property boundary – confirmation required from survey M – Remove rear access reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (west of 2) channel. L – Remove boat, vehicles and building equipment





## 5. Block D (Thyssen Crescent lots)

This section refers to the drainage on Block D and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Thyssen Crescent.

A separate report on the Block D has been prepared.

The drainage reserve received and conveys flows from the rear half of the Thyssen Crescent lots.

## 5.1 Lot No. 177 Thyssen Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Dense vegetaion
<b>Photo ID</b>	882
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 5.2 Lot No. 178 Thyssen Crescent



<b>Category</b>	Drain Maintenance/ Encroachment
<b>Type</b>	Vegetation Rear access
<b>Description</b>	Dense vegetation Rear access impeding flow
<b>Photo ID</b>	881
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain M – Remove rear access and reinstate to natural drain



### 5.3 Lot No. 179 Thyssen Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Dense bush
<b>Photo ID</b>	880
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

#### 5.4 Lot No. 180 Thyssen Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Dense Vegetation
<b>Photo ID</b>	879
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 5.5 Lot No. 181 Thyssen Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Dense vegetation
<b>Photo ID</b>	878
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 5.6 Lot No. 1,181 Thyssen Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	M - Dense vegetation
<b>Photo ID</b>	877
<b>Scope of Works</b>	Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain





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**Rio Tinto Iron Ore**  
Report on Dampier Drainage  
Review  
Block 6 Encroachments  
June 2010





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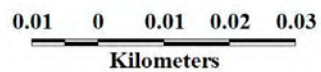


# 1. Block 6 Encroachments



LEGEND

- Roads
- ▭ Cadastre
- ▭ Block Boundary
- ▭ Encroachment - Low
- ▭ Encroachment - Medium
- ▭ Encroachment - High



**RioTinto**

Client Name: RTIO  
Project Name: Dampier Drainage Assessment

Job Number | 6125224  
Revision | A  
Date | 17/08/2010

## Block 6 Encroachments

Figure 1

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## 2. Prinsep Crescent (Tachikawa Crescent lots)

This section refers to the street drainage along Prinsep Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Tachikawa Crescent.

Prinsep Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Tachikawa Crescent lots. This discharges in a westerly direction towards East Avenue.

**2.1 Lot No. 1,132 Tachikawa Crescent**



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense vegetation
<b>Photo ID</b>	1080
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



## 2.2 Lot No. 2,132 Tachikawa Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi-dense vegetation
<b>Photo ID</b>	904
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

### 2.3 Lot No. 3,132 Tachikawa Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access; Boundary extension.
<b>Description</b>	Rear access with culverts impeding flow; Green shed within drainage reserve.
<b>Photo ID</b>	7302
<b>Scope of Works</b>	M - Remove rear acces and reinstate drainage flowpath as defined by the upstream and down stream cross section and uniform grade; L – Remove shed and relocate to within property boundary – confirmation required from survey.



### 3. Boolgeeda Court (Prinsep Crescent lots 132 – 135)

This section refers to the street drainage along Boolgeeda Court and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Prinsep Crescent.

Boolgeeda Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Prinsep Crescent lots. This discharges in a westerly direction towards East Avenue.



### 3.1 Lot No. 132 Prinsep Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation,
<b>Description</b>	Dense vegetation Flow path adequate.
<b>Photo ID</b>	903
<b>Scope of Works</b>	H - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 3.2 Lot No. 133 Prinsep Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access with culvert impeding flow.
<b>Photo ID</b>	902
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (132) channel



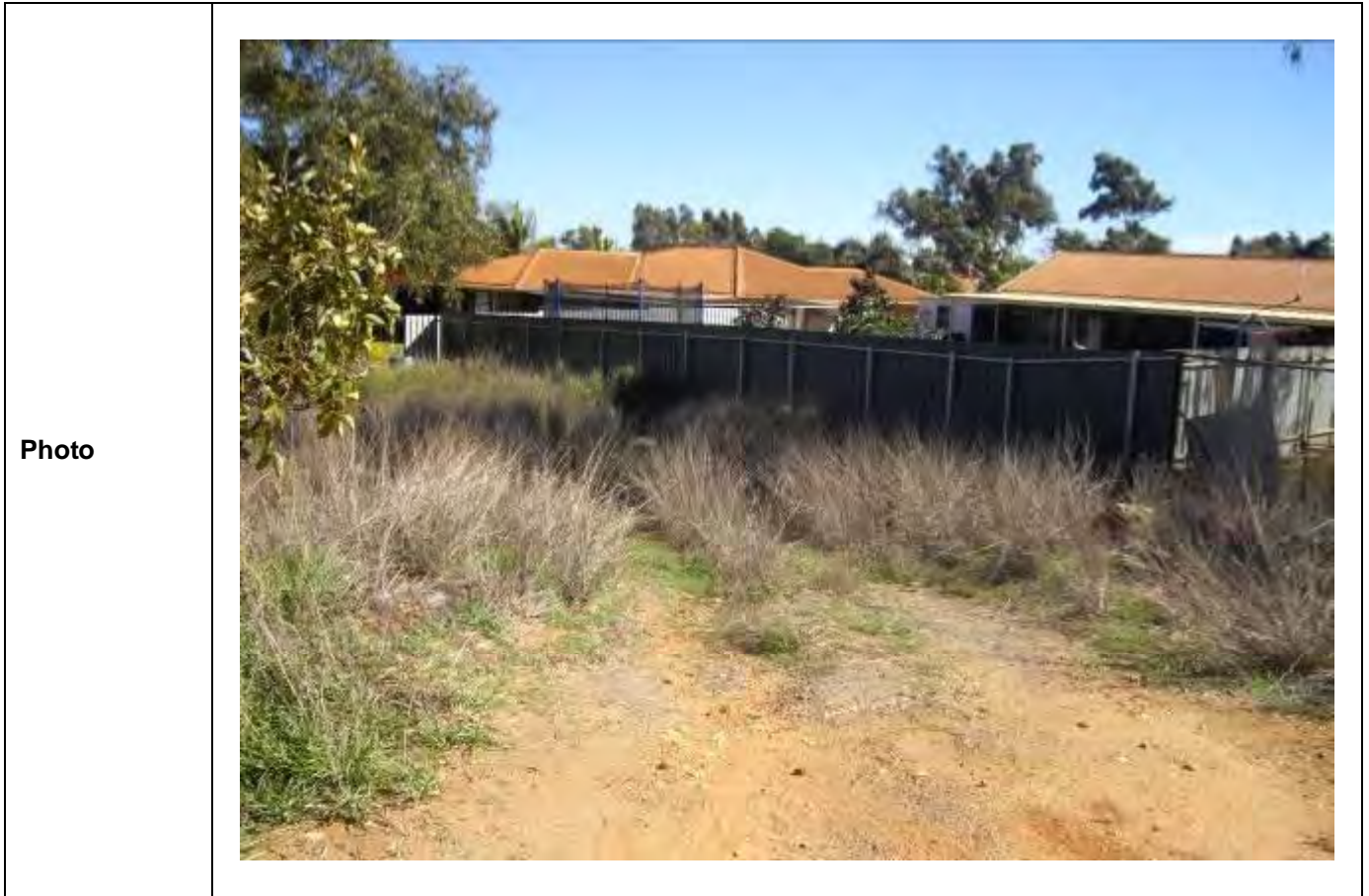
### 3.3 Lot No. 134 Prinsep Crescent



<b>Category</b>	Encroachment/ Drain maintenance
<b>Type</b>	Rear access; Vegetation.
<b>Description</b>	Rear access with culvert; Semi-dense vegetation.
<b>Photo ID</b>	7301
<b>Scope of Works</b>	H – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (133) channel M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



### 3.4 Lot No. 135 Prinsep Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	Rear access Vegetation
<b>Description</b>	Rear access follows natural topography Semi-dense vegetation
<b>Photo ID</b>	891
<b>Scope of Works</b>	L – Remove rear access M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



#### 4. Drummond Crescent (Prinsep Crescent lots 136 – 3,139)

This section refers to the street drainage along Drummond Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Prinsep Crescent.

Drummond Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Prinsep Crescent lots. This discharges in a westerly direction towards East Avenue.

#### 4.1 Lot No. 136 Prinsep Crescent



<b>Category</b>	Encroachment / Drain Maintenance
<b>Type</b>	General items Vegetation
<b>Description</b>	Boat, trailer, drums and building materials Semi densi vegetation
<b>Photo ID</b>	7295
<b>Scope of Works</b>	M – Remove boat, trailer, drums and building materials M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 4.2 Lot No. 137 Prinsep Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Rear access Vegetation
<b>Description</b>	Rear access follows natural topography with some impedance to flow Semi dense vegetation
<b>Photo ID</b>	890
<b>Scope of Works</b>	M – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (136) channel. M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 4.3 Lot No. 138 Prinsep Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General items Rear access Flow path.
<b>Description</b>	Trailer, rubbish, building materials; Rear access driveway follows modified topography Ill defined due to extensive modifications to drainage resere.
<b>Photo ID</b>	7294
<b>Scope of Works</b>	L – Remove trailer, rubbish and building materials; M - Remove rear access; H – Reinststate drainage flow path as defined by the natural capacity and invert of downstream lot (137) channel

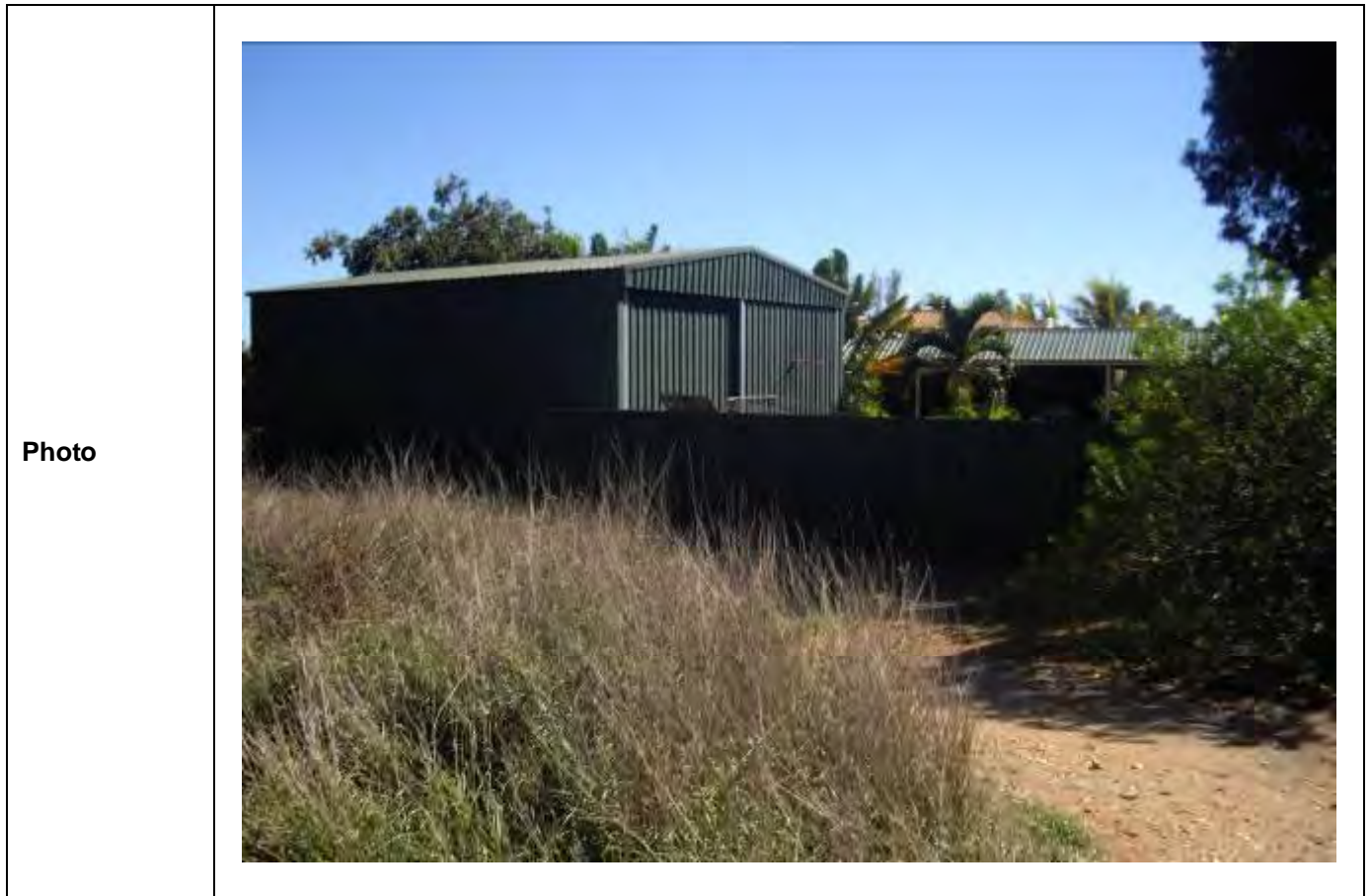
#### 4.4 Lot No. 139 Prinsep Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Rocks
<b>Description</b>	Semi dense low lying vegetation; Semi - large rocks do not impede flow
<b>Photo ID</b>	888
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



#### 4.5 Lot No. 1,139 Prinsep Crescent



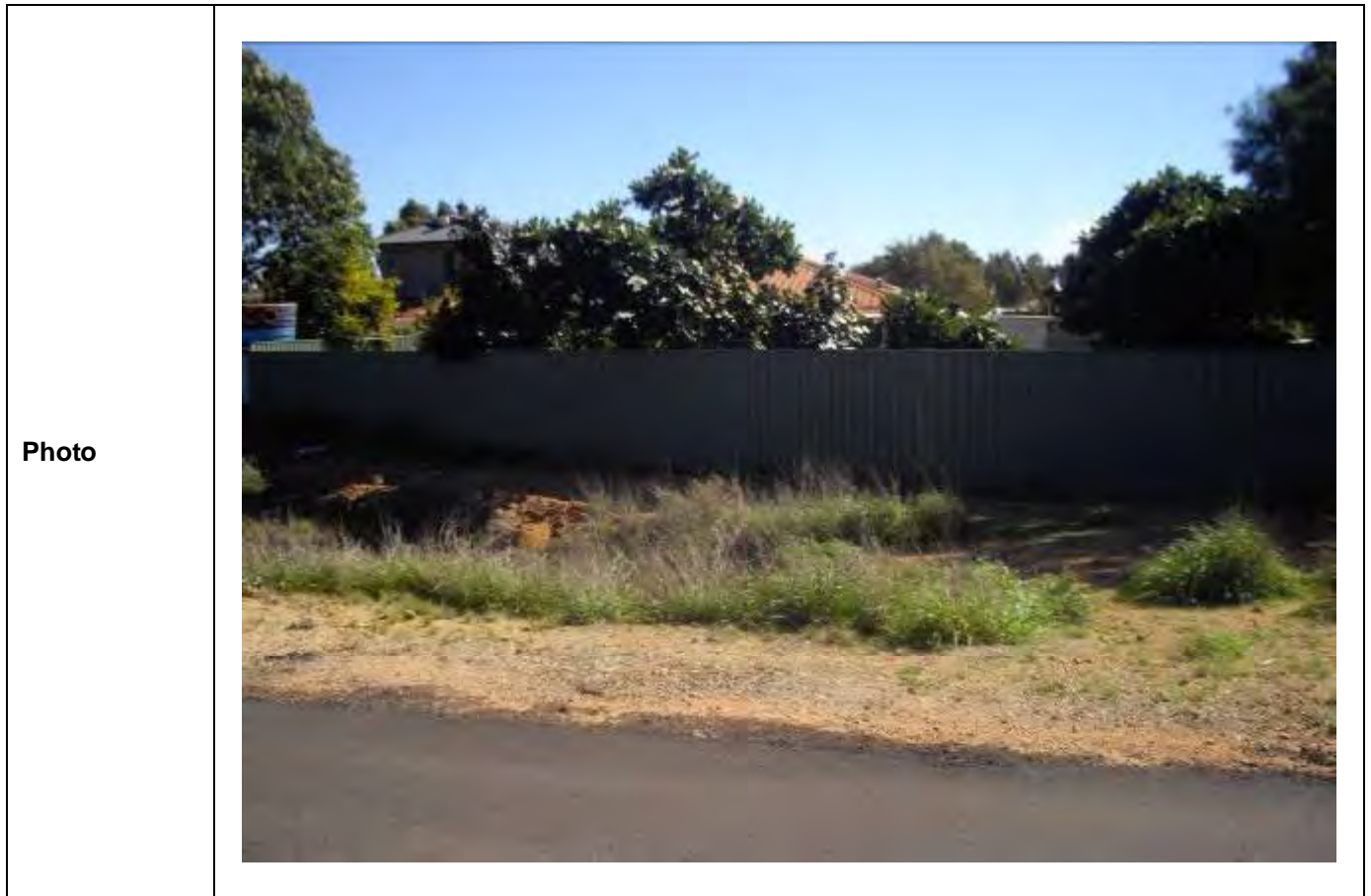
<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension Rear access Modified drainage reserve Vegetation
<b>Description</b>	Shed Rear access follows natural topography Fill material making drainage reserve higher than road reserve Semi dense vegetation
<b>Photo ID</b>	887
<b>Scope of Works</b>	L – Remove shed and relocate to within property boundary L – Remove rear access M - Remove fill material M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

#### 4.6 Lot No. 2,139 Prinsep Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension General items Rear access.
<b>Description</b>	Above ground pool within drainage reserve/ drainage reserve is within the property boundary Trailers, vehicles Rear access follows natural topography
<b>Photo ID</b>	7293
<b>Scope of Works</b>	H – Remove above ground pool – confirmation required from survey L – Remove trailers and vehicles M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.

#### 4.7 Lot No. 3,139 Prinsep Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Modified drainage reserve Rear access
<b>Description</b>	Modified drainage reserve has essentially blocked the existing culvert; Rear access impedes flow
<b>Photo ID</b>	886
<b>Scope of Works</b>	H - Remove modifications and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (2,139) channel H – Remove rear access





## 5. Hannan Crescent (Boolgeeda Court and Drummond Crescent lots)

This section refers to the street drainage along Hannan Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Boolgeeda Court and Drummond Crescent.

Hannan Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Drummond Crescent lots. This discharges in a westerly direction from lot 144 towards to the reserve between the Boolgeeda Court lot 1,145 and Drummond Crescent lot 145.

**5.1 Lot No. 140 Drummond Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Modified drain reserve
<b>Description</b>	Mound of dirt, organic matter and created parking area. Potential contributions to blocking the culvert under Drummond Crescent.
<b>Photo ID</b>	685
<b>Scope of Works</b>	M – Remove mound of dirt, organic matter and created parking area.


## 5.2 Lot No. 141 Drummond Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension; General item; Rear access.
<b>Description</b>	Fence; Boat; Rear access follows natural topography. Overland flow is towards lots but is not a collected concentrated flow.
<b>Photo ID</b>	896
<b>Scope of Works</b>	L - Remove fence to within property boundary – confirmation required from survey; L – Remove boat; L – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (140) channel



**5.3 Lot No. 142 Drummond Crescent**

<p><b>Photo</b></p>	
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<p><b>Category</b></p>	<p>Encroachment</p>
<p><b>Type</b></p>	<p>Rear access</p>
<p><b>Description</b></p>	<p>Rear access follows natural topography. Overland flow is towards lots but is not a collected concentrated flow.</p>
<p><b>Photo ID</b></p>	<p>897</p>
<p><b>Scope of Works</b></p>	<p>L – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (141) channel</p>

#### 5.4 Lot No. 143 Drummond Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access
<b>Description</b>	Rear access follows natural topography. Overland flow is towards lots but is not a collected concentrated flow.
<b>Photo ID</b>	898
<b>Scope of Works</b>	L – Remove rear access and reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (142) channel

## 5.5 Lot No. 144 Drummond Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Boundary extension Vegetation
<b>Description</b>	Fence within drainage boundary Semi-dense vegetation
<b>Photo ID</b>	7300
<b>Scope of Works</b>	M – Remove fence and relocate to within property boundary M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 5.6 Lot No. 145 Drummond Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path Vegetation
<b>Description</b>	Flow path channel ok Semi dense vegetation
<b>Photo ID</b>	899
<b>Scope of Works</b>	L - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

## 5.7 Lot No. 1,145 Boolgeeda Court



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Overland flow is towards lots but is not a collected concentrated flow.
<b>Photo ID</b>	6
<b>Scope of Works</b>	L - reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (drainage reserve between lots 1,145 and 145) channel



## 5.8 Lot No. 2,145 Boolgeeda Court



<b>Category</b>	Drain maintenance
<b>Type</b>	Flow path
<b>Description</b>	Overland flow is towards lots but is not a collected concentrated flow. Fill
<b>Photo ID</b>	7
<b>Scope of Works</b>	L - reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (lot 1,145) channel M – remove fill



**5.9 Lot No. 3,145 Boolgeeda Court**



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path
<b>Description</b>	Overland flow is towards lots but is not a collected concentrated flow. Fill
<b>Photo ID</b>	8
<b>Scope of Works</b>	L - reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (East Ave drainage reserve) channel M – remove fill



## 6. Giles Crescent (Hannan Crescent lots)

This section refers to the street drainage along Giles Crescent and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Hannan Crescent.

Giles Crescent receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

The drainage reserve received and conveys flows from the rear half of the Hannan Crescent lots. This discharges in a westerly direction towards East Avenue.

## 6.1 Lot No. 146 Hannan Crescent



<b>Category</b>	Encroachment / Drain maintenance
<b>Type</b>	Rear access
<b>Description</b>	Rear access impeding flow Semi-dense vegetation
<b>Photo ID</b>	414
<b>Scope of Works</b>	H – Remove rear access and reinstate to natural channel M – Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 6.2 Lot No. 147 Hannan Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation Rocks
<b>Description</b>	Semi-dense low lying vegetation Rocks do not impede flow
<b>Photo ID</b>	892
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain

### 6.3 Lot No. 148 Hannan Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Semi dense vegetation
<b>Photo ID</b>	893
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain



## 6.4 Lot No. 149 Hannan Crescent



<b>Category</b>	Encroachment
<b>Type</b>	General item
<b>Description</b>	Trailer
<b>Photo ID</b>	10
<b>Scope of Works</b>	L - Remove trailer



## 6.5 Lot No. 150 Hannan Crescent



<b>Category</b>	None
<b>Type</b>	None
<b>Description</b>	None
<b>Photo ID</b>	11
<b>Scope of Works</b>	None required.

## 6.6 Lot No. 151 Hannan Crescent



<b>Category</b>	Drain maintenance
<b>Type</b>	Rocks
<b>Description</b>	Rocks do not impede flow
<b>Photo ID</b>	12
<b>Scope of Works</b>	None



## 6.7 Lot No. 1,151 Hannan Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Vegetation
<b>Description</b>	Vegetation impeding flow
<b>Photo ID</b>	895
<b>Scope of Works</b>	M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain





## 7. Eyre Court (Giles Crescent lots)

This section refers to the street drainage along Eyre Court and the adjacent drainage reserve immediately north. The lots referred to are those with an address on Giles Crescent.

Eyre Court receives and conveys flow from the front half of its upstream lots. This discharges in a westerly direction.

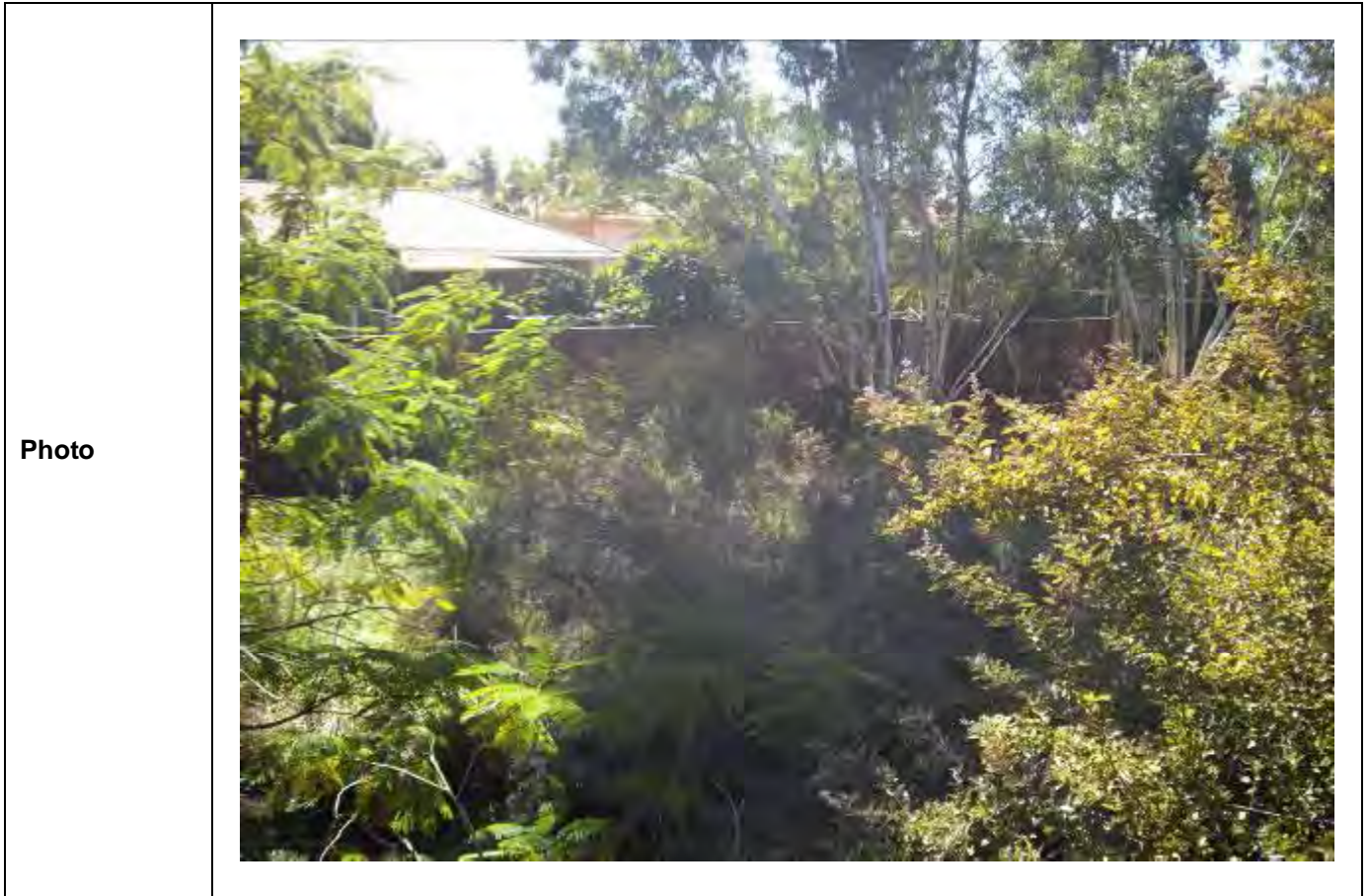
The drainage reserve received and conveys flows from the rear half of the Giles Crescent lots. This discharges in a westerly direction towards East Avenue.

**7.1 Lot No. 1,152 Giles Crescent**



<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Fence
<b>Photo ID</b>	14
<b>Scope of Works</b>	L – Remove fence and relocate to within the property boundary.

## 7.2 Lot No. 152 Giles Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path Vegetation
<b>Description</b>	Drainage path is not defined Semi-dense low lying vegetation
<b>Photo ID</b>	883
<b>Scope of Works</b>	M - reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (153) channel M - Vegetation is to be slashed to a nominal height of 50 mm above ground with the exception of large, established trees of height in excess of 5 m, which shall remain.



### 7.3 Lot No. 153 Giles Crescent



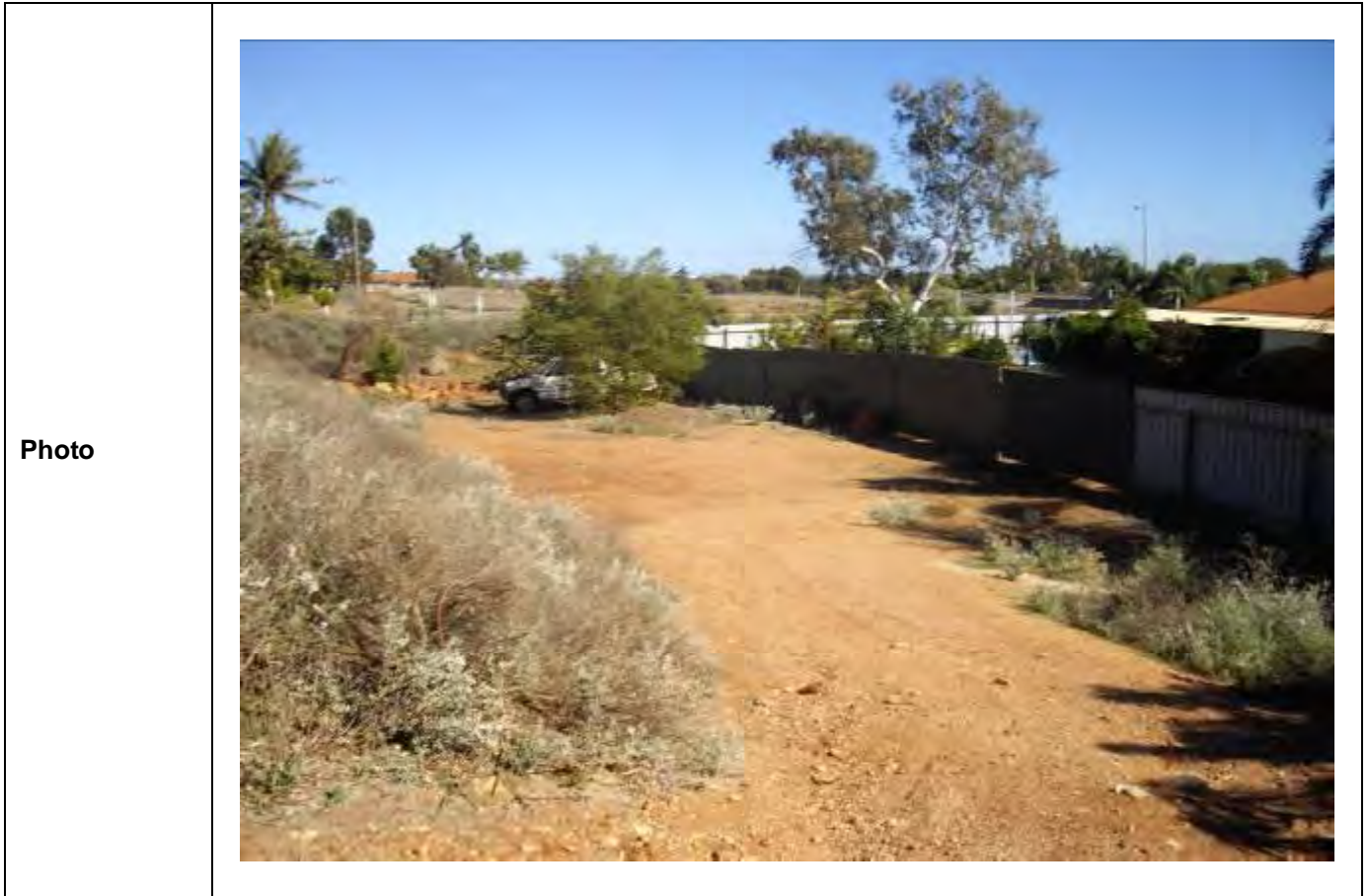
<b>Category</b>	Drain Maintenance / Encroachment
<b>Type</b>	Flow path Boundary encroachment.
<b>Description</b>	Drainage flow path within property boundary; Fence.
<b>Photo ID</b>	13
<b>Scope of Works</b>	M – reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (154) channel M – Remove fence and relocate to within the property boundary.

## 7.4 Lot No. 154 Giles Crescent



<b>Category</b>	Drain Maintenance
<b>Type</b>	Flow path Rear access
<b>Description</b>	Drainage flow path low point is within the property boundary Rear access has reduced the cross sectional capacity
<b>Photo ID</b>	884
<b>Scope of Works</b>	H – reinstate drainage flow path as defined by the natural capacity and invert of downstream lot (155) channel to be contained within the drainage reserve H – Remove rear access

## 7.5 Lot No. 155 Giles Crescent



<b>Category</b>	Encroachment
<b>Type</b>	Rear access General item.
<b>Description</b>	Rear access follows natural topography Vehicle.
<b>Photo ID</b>	885
<b>Scope of Works</b>	H - Remove rear access and reinstate to natural drainage channel L – Remove vehicle



## 8. Eyre Court lots

This section refers to the lots referred with an address on Eyre Court.

The drainage reserve received and conveys flows from the rear half of the Eyre Court lots. This discharges in a westerly direction towards East Avenue.

### 8.1 Lot No. 1,155 Eyre Court



<b>Category</b>	Encroachment
<b>Type</b>	General items
<b>Description</b>	Caravan is in the drainage reserve but not impeding flow.
<b>Photo ID</b>	686



<b>Scope of Works</b>	L – Remove caravan.
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## 8.2 Lot No. 2,155 Eyre Court

<b>Photo</b>	
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<b>Category</b>	Encroachment
<b>Type</b>	Boundary extension
<b>Description</b>	Batter encroachment. Parking area outside the property boundary on East side of lot.
<b>Photo ID</b>	905
<b>Scope of Works</b>	L – Remove illegal parking area.





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**Document Status**

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		Name	Signature	Name	Signature	Date
A	A Dow	M Stovold		G Yandle		20/1/11



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