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Lot 901 (150) Flynn Drive, Neerabup
Carramar Resource Industries

TRANSPORT STATEMENT

- Revision 1
- 28/11/14

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Contents

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1. Introduction

1.1 Purpose of This Report

This report was commissioned by Complex Land Solutions on behalf of Carramar Resource Industries to document a traffic impact assessment in support of an extractive industries licence for the operations proposed on Lot 150 (street number 150) Flynn Drive in Neerabup.

As part of the approval processes a Transport Statement (due to the size of the development, a "moderate" impact is expected with typical AM/PM peak hour vehicular trips less than 100 per hour) is required to assist the City of Wanneroo in their assessment of the extractive industries licence.

1.2 Proposed Development

Lot 901 (street number 150) Flynn Drive in Neerabup (totalling approximately 35.75Ha) is proposed to be developed into sand quarry and resource recovery operation, refer to **Appendix A** for an aerial view showing the current development.

Access to the development is proposed to be via two existing crossovers, both from Flynn Drive.

Development in the vicinity is industrial with a mix of warehousing and other commercial uses.

2. Vehicle Access & Parking

2.1 Access to Development

As discussed in **Section 1.2**, access to the proposed development is proposed to be via two existing crossovers on Flynn Drive. The western crossover is located approximately 80m east of the western lot boundary and is the main access for 90% of vehicles accessing the site, whilst the other crossover is located approximately 200m further east at close to the centre of the lot frontage of Flynn Drive. The western crossover is approximately 25m wide whilst the eastern crossover is approximately 20m wide. The sight lines to and from these are acceptable with the minimum 178m for truck movements (for an 8 second gap) for an 80km/h speed limit achieved for both approaches to both crossovers on Flynn Drive in accordance with Australian Standards publication, *AS 2890.2-2002 Parking facilities Part 2: Off-street commercial vehicle facilities*. The assessed sight distances are approximately:

- Western crossover: 300m to west, 450 m to east; and,
- Eastern crossover 500m to west, 250m to east.

The crossovers will be able to accommodate vehicles up to semi-trailer or single unit with dog trailer size. The typical vehicle to access the quarry is presently a single unit truck with 90% of the vehicles this size. The remainder would be semi-trailer and smaller motor vehicles, such as utes and passenger cars.

2.2 Service Vehicles

Service vehicles accessing the site are expected to enter the site in forward gear and there is ample on-site pavement for these vehicles to then re-enter Flynn Drive in forward gear.

3. Daily Traffic Volumes and Vehicle Types

3.1 Current Traffic

Traffic flows on Flynn Drive were based on recorded data from Main Roads from counts undertaken in October 2013. These counts have shown that traffic flows have increased approximately 4% per annum when compared to counts undertaken in 2009 over the same period. For this report, it has been assumed that the current traffic flows will increase by a similar growth in future years. The directional flows and total flows summarised below:

- 75 eastbound/85 westbound vehicular trips in the AM peak hour;
- 55 eastbound/55 westbound vehicular trips in the PM peak hour; and,
- 1,440 total vehicular trips per day, both directions combined.

3.2 Trip Generation of Proposed Development

The traffic generation expected from the development was based on the current traffic flows operating on the current operations on the site. These volumes are expected to remain relatively the same in the future. These flows are:

- Western Crossover:
  - Heavy Vehicles: 100 trips to site, 100 trips from site per day (typically 6am to 4pm)
  - Light Vehicles: 5 trips to site, 5 trips from site per day (typically AM/PM peak)

- Eastern Crossover:
  - Heavy Vehicles: 10 trips to site, 10 trips from site per day (typically 6am to 4pm)
  - Light Vehicles: 2 trips to site, 2 trips from site per day (typically AM/PM peak)

- Entire Development:
  - Heavy Vehicles: 110 trips to site, 110 trips from site per day (typically 6am to 4pm)
  - Light Vehicles: 7 trips to site, 7 trips from site per day (typically AM/PM peak)

Vehicles accessing the site are expected to be a mixture of private motor vehicle sized cars with larger semi-trailer sized vehicles being the largest vehicle expected on site.

3.3 Trip Distribution

It would be reasonable to assume that traffic would be attracted to the site on the roads where there is parking access provided, in this case being from solely from Flynn Drive. Also, the expected traffic would approach the development predominantly to and from the west (estimated at 80%) with the remainder to and from the east.

3.4 Traffic Impact of Development

Flynn Drive is expected to have traffic volumes that should not exceed the capacity for similar roads of its type. These values should be approximately less than 10% of the capacity of Flynn

Drive. Typical daily variation is flows can be up to 5% either side of the long term average for a road, so the increase in traffic will not be noticeable on Flynn Drive and the wider street network away from the development. The comparisons to maximum flows that these roads should carry are shown below in **Tables 3.1 and 3.2**.

▪ Table 3.1 – Current Daily Flows

Road	Capacity (two-way)	Actual Daily Flow (two-way)
Flynn Drive	18,530[1]	1,440

▪ Table 3.2 – Expected Daily Flows (in 10 years)

Road	Capacity (two-way)	Expected Daily Flow (two-way)
Flynn Drive	18,530	2,130

With regards to intersections, Table 2.4 from the Austroads publication, *Guide to Traffic Management Part 6 – Intersections, Interchanges and Crossings* provides advice as to intersection and crossover performance in peak flow conditions with regards to possible further analysis. This is summarized below in **Table 3.3**.

▪ Table 3.3 – Austroads Guidelines

Major Road Type	Major Road Flow (vph, two-way)	Minor Road Flow (vph, two-way)
Two-lane	400	250
	500	200
	650	100
Four-lane	1000	100
	1500	50
	2000	25

[1] Based on Austroads – Guide to Traffic Engineering Practice, Part 2. Based on maximum flow for LOS E, K factor of 0.11, 45/55 directional split, 26% HV proportion and current road widths for level terrain.

Applying the rates from **Sections 3.1 and 3.2, Table 3.4** is derived.

- Table 3.4 – Comparison to Austroads Guidelines

Intersection	Major Road Flow (vph, two-way)	Minor Road Flow (vph, two-way)
Western Crossover	240 (AM Peak)	30 (AM Peak)
Eastern Crossover	240 (AM Peak)	5 (Am Peak)

From the above it can be seen that in approximately 10 years time, both these crossovers should have volumes that should not exceed the values given in **Table 3.3** and further analysis is not required. Under these flows, the crossovers would be operating at the best level of service, being A with minimal delays and queues, either exiting the site or on Flynn Drive waiting to turn into the site.

3.5 Level of Service Concepts

The level of service concept describes the quality of traffic service in terms of six levels, designated A to F, with level of service A (LOS A) representing the best operating condition (i.e. at or close to free flow), and level of service F (LOS F) the worst (i.e. forced flow). More specifically:

- *LOS A*: Primarily free flow operations at average travel speeds, usually about 90% of the FFS (free flow speed) for the given street class. Vehicles are completely unimpeded in their ability to manoeuvre within the traffic stream. Control delay at signalised intersections is less than 10 seconds. At non-signalised movements at intersections the average control delay is less than 10 seconds;
- *LOS B*: Reasonably unimpeded operations at average travel speeds, usually about 70% of the FFS for the street class. The ability to manoeuvre within the traffic stream is only slightly restricted, and control delays at signalised intersections are between 10 and 20 seconds. At non-signalised movements at intersections the average control delay is between 10 and 15 seconds;
- *LOS C*: Stable operations; however, ability to manoeuvre and change lanes in mid-block locations may be more restricted than at LOS B, and longer queues, adverse signal coordination, or both may contribute to lower average travel speeds of about 50% of the FFS for the street class. Signalised intersection delays are between 20 and 35 seconds. At non-signalised movements at intersections the average control delay is between 15 and 25 seconds;

- *LOS D*: A range in which small increases in flow may cause substantial increases in delay and decreases in travel speed. LOS D may be due to adverse signal progression, inappropriate signal timing, high volumes, or a combination of these factors. Average travel speeds are about 40% of FFS. Signalised intersection delays are between 35 and 55 seconds. At non-signalised movements at intersections the average control delay is between 25 and 35 seconds;
- *LOS E:* Characterised by significant delays and average travel speeds of 33% of the FFS or less. Such operations are caused by a combination of adverse progression, high signal density, high volumes, extensive delays at critical intersections (between 55 and 80 seconds), and inappropriate signal timing. At non-signalised movements at intersections the average control delay is between 35 and 50 seconds; and,
- *LOS F*: Characterised by urban street flow at extremely low speeds, typically 25% to 33% of the FFS. Intersection congestion is likely at critical signalised locations, with high delays (in excess of 80 seconds), high volumes, and extensive queuing. At non-signalised movements at intersections the average control delay is greater than 50 seconds

In addition to the above:

- Average Delay: is the average of all travel time delays for vehicles through the intersection; and,
- Queue: is the queue length below which 95% of all observed queue lengths fall.

4. Traffic Management on the Frontage Streets

4.1 Flynn Drive

This road is classified as a Regional Distributor in the functional road hierarchy (and is classified as an "Other Regional Road" or "Blue" road under the MRS) and carries in the order of 1,440 vehicles per day. It is a single carriageway two-lane, two-way road with a pavement width of approximately 7.2m with 1.5m sealed shoulders either side of the main carriageway within a reserve of 20m width. Flynn Drive is subject to the 80km/h posted speed limit.

Either side of the development site there are slight crests in the road. These crests allow sight distances of 250m from the eastern crossover to the eastern crest and 300m from the western crossover to the western crest.

Flynn drive is part of the Networks 1 to 4 of the Restricted Access Vehicle network. Vehicles in these networks can be up to B-Double size vehicles up to 27.5 in length.

5. Safety Issues

5.1 Flynn Drive

The section of Flynn Drive from approximately 900m west of the site to 10m prior to the intersection of Old Yanchep Road has had two (2) recorded crashes in the five years up to 31/12/2013. Both of these were "Hit Animal" type crashes and nether were fatal crashes. This represents a crash rate of approximately 0.40 crashes per million vehicle kilometres (MVkm). This is an acceptable safety record as it is less than the average network crash rate for similar roads of 0.67 crashes per MVkm and the critical crash rate of 2.52 crashes per MVkm (based on the current traffic volumes on Flynn Drive) and thus requires no further assessment. The increase in traffic flows due to the development should not lead to any significant safety issues.

5.2 Critical Crash Rate

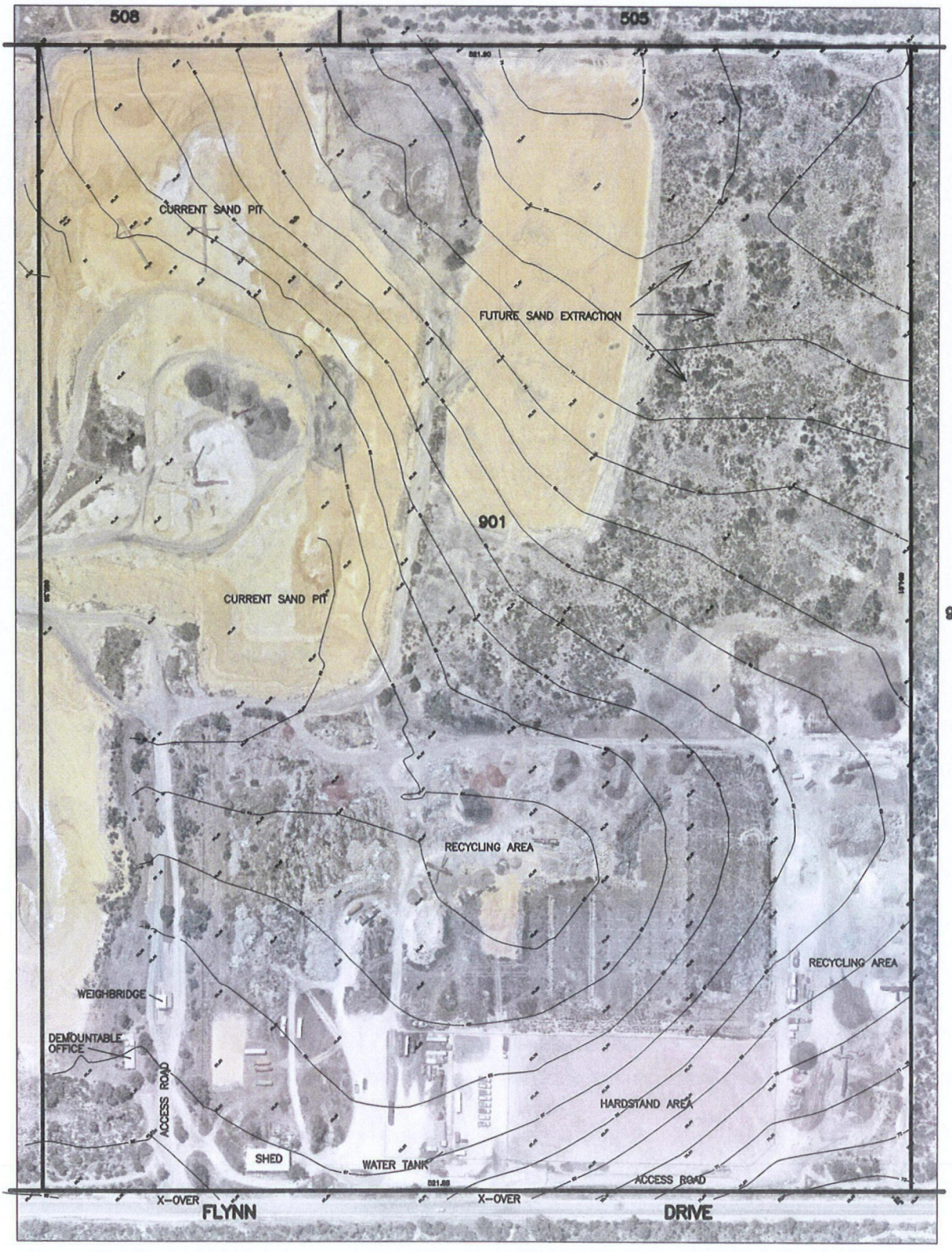
This is the crash rate above which crashes occur in excess of a significance level above the network average. The critical crash rates described above are at the upper 5% value, one tailed. Crashes which occur at a rate greater than the network average and less than the critical crash rate (based on either the MV or MVkm exposure level) are typically acceptable. As the crash rate approaches and then exceeds the critical crash rate this suggests a possible safety issue, e.g. Critical Rate Factor (CRF) of 0.9 and above.

6. Conclusions

As a result of the traffic analysis undertaken for proposed development of Lot 901 (street number 150) Flynn Drive, Neerabup, the following findings were made:

- The proposed development should not generate significant vehicular trips;
- The impacts of the traffic volumes associated with the development on the road network are considered acceptable; and,
- Crossover controls and geometries are considered appropriate.

Appendix A Proposed Development Plans



FEATURE SURVEY ONLY – RELATIONSHIP TO BOUNDARIES CANNOT BE GUARANTEED.

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LOT 901 (No.150) FLYNN DRIVE – NEERABUP

SITE PLAN

SCALE:	1:1250 @ A1 SIZE	LOCAL AUTHORITY: CITY OF WANNEROO	SURVEYOR: RAM
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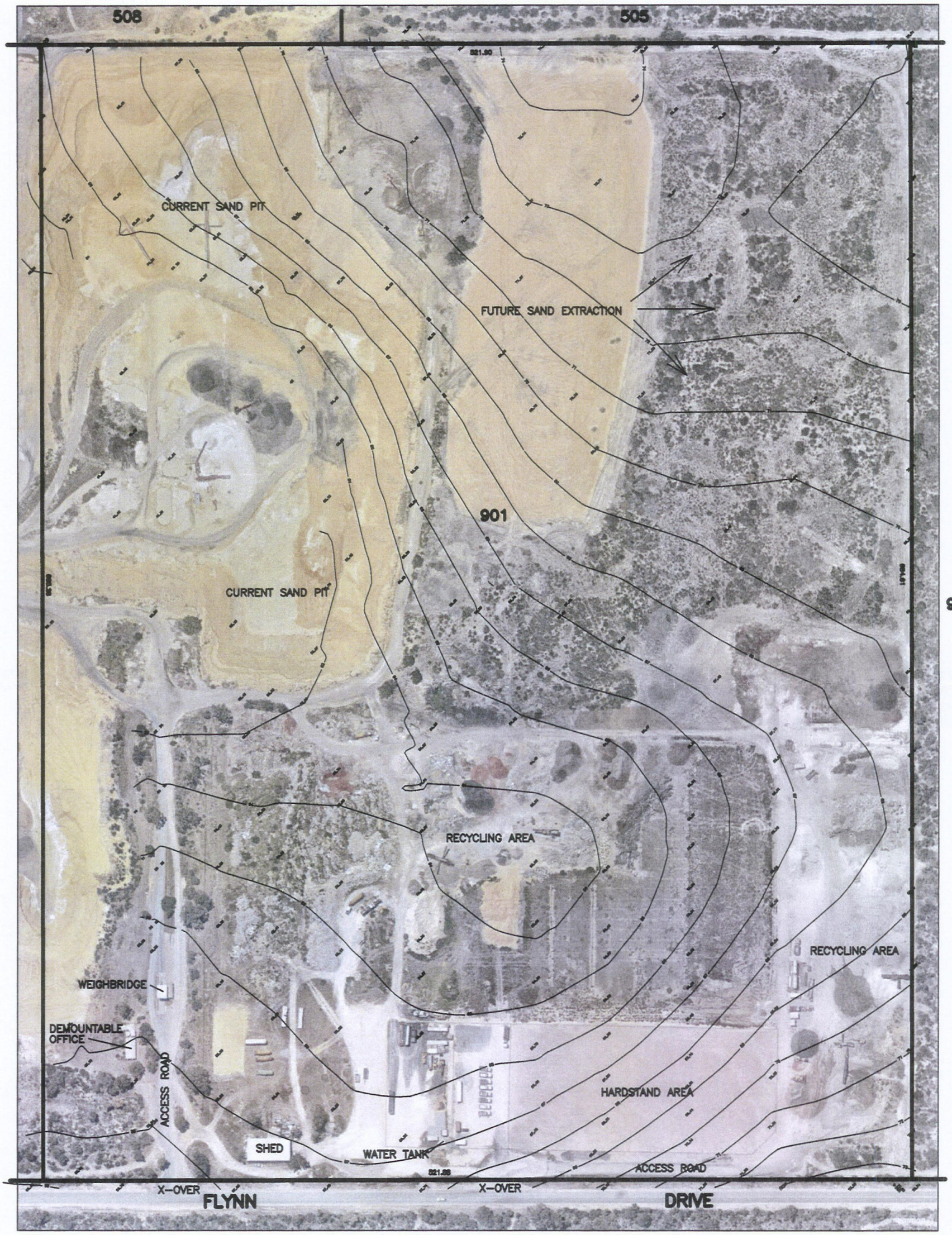

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SITE PLAN

SCALE: 1:1250 @ A1 SIZE	LOCAL AUTHORITY: CITY OF WANNEROO		SURVEYOR: RAM
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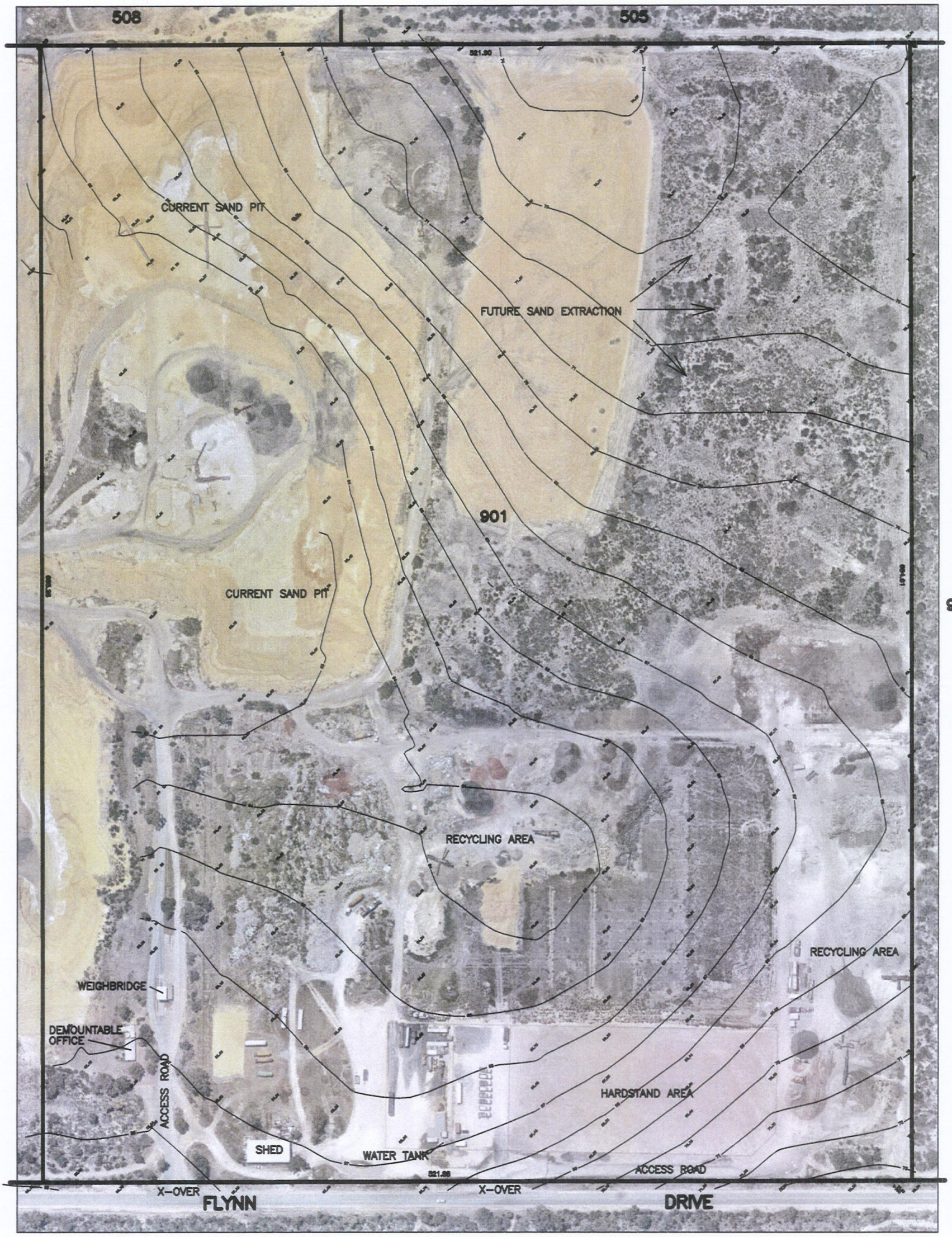

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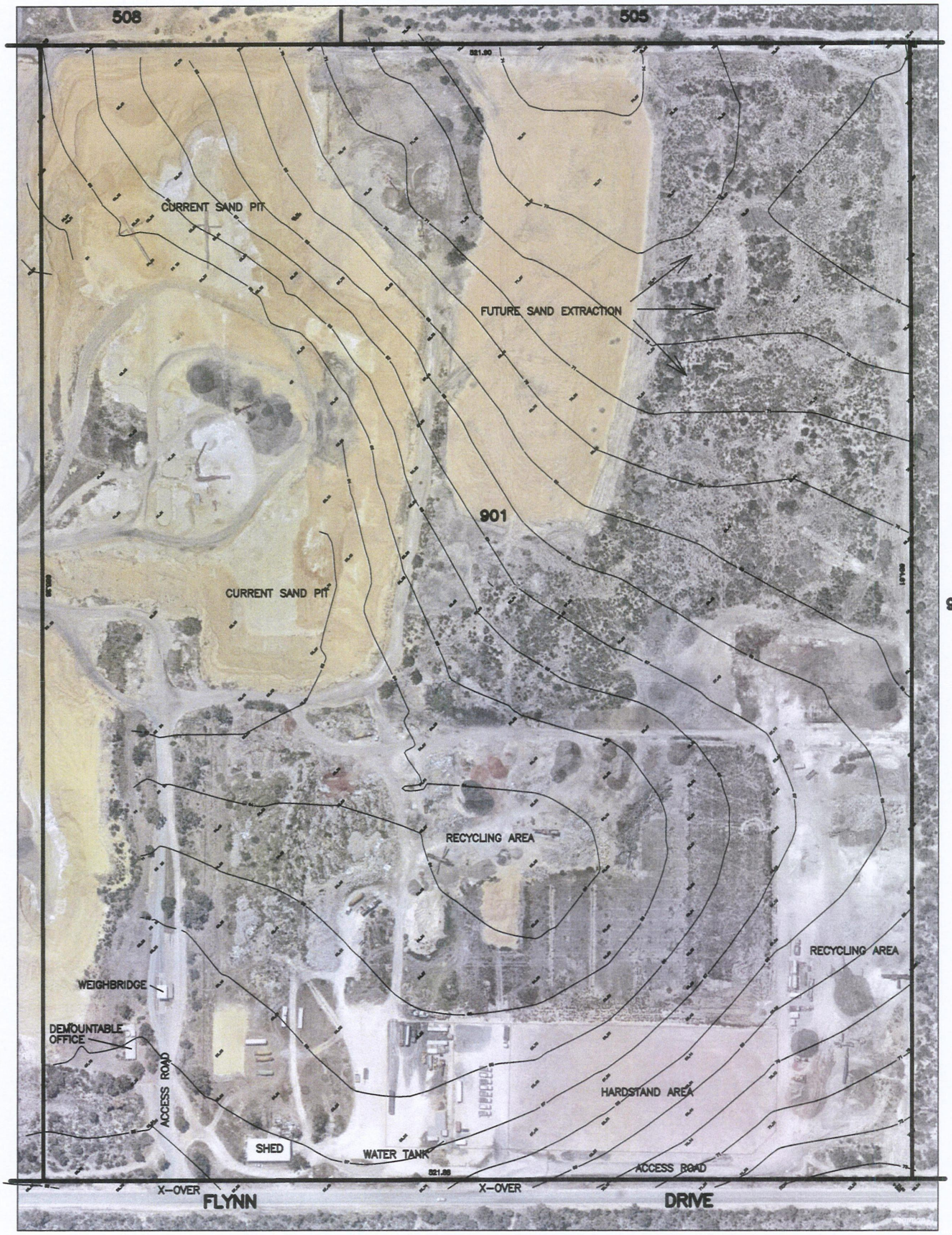

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