Donaldson Coal Pty Limited

ABEL UNDERGROUND MINE PART 3A ENVIRONMENTAL ASSESSMENT

Appendix L

Traffic and Transport Assessment

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Donaldson Coal Pty Ltd

Proposed Abel Underground Mine

Traffic and Transport Assessment

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1. Introduction

Donaldson Coal Pty Ltd (Donaldson Coal) currently owns and operates the Donaldson Open Cut Mine (Donaldson Mine), west of Beresfield, approximately 23 kilometres north-west of Newcastle. This open cut mine has approval to operate until 2012 when it is expected that current reserves will have been exhausted. The existing mine is situated on a large tract of land north of John Renshaw Drive and west of Weakleys Drive. Access to the site is currently from the New England Highway but a new access intersection off John Renshaw Drive is currently under construction and will be operational in June 2006.

Donaldson Coal proposes to develop a new underground mine south of the existing Donaldson Mine, generally between John Renshaw Drive and George Booth Drive, bounded on the eastern side by the F3 Freeway and the western side by the Buttai Creek area.

The proposed underground mine, to be known as Abel Underground Mine (Abel Mine), would have a production capacity of approximately 4.5 million tonnes of coal per annum over a period of 20 years. The new mine would utilise areas of already disturbed land within the Donaldson Mine Lease for surface infrastructure and would also continue to use the existing Bloomfield Coal Handling and Preparation Plant (CHPP) for coal processing and loading on to trains. All coal is to be transported to the Port of Newcastle by rail via the existing Bloomfield rail loop connection to the Great Northern Railway near Thornton.

Access to the new underground mine areas would be from the Donaldson Mine high wall on the northern side of John Renshaw Drive and then under that road by way of a deep portal. Underground mining would commence on the southern side of John Renshaw Drive and progress southwards. Coal will be transported underground via conveyor back through to the high wall and the proposed surface infrastructure area located within the existing Donaldson Mine.

Connell Wagner was engaged by Donaldson Coal to undertake the necessary Traffic and Transport Assessment for the Abel Mine proposal as an input to the overall Environmental Impact Assessment for the project.

The Traffic and Transport assessment is primarily associated with road network access to the site and the impact that mining operations and traffic generated by the development would have on existing roads and traffic conditions in the vicinity of the proposed mine.

This report represents our findings in relation to existing and projected traffic volumes on the road network and the expected impact of new traffic generated by the Abel Mine development.

2. Background to Traffic and Transport Assessment

The Traffic and Transport Assessment to be undertaken for the proposed Abel Mine is required to assess the impact that the proposed mine may have on the existing road network and the need or otherwise for any specific or associated road improvements that would cater for additional traffic generated by the proposed development.

As outlined above, the proposed Abel Mine is expected to produce 4.5 million tonnes of coal per annum and it is confirmed that all coal produced will be transported by rail. In order to provide this production capacity it is expected that a total of 375 employees will be on site over a 24 hour / 3 shift production cycle. The impact of the number of trips to be generated by these employees and other mine associated traffic generation will form the basis of this assessment.

In providing this assessment there are two key areas where the mine based traffic generation and movement pattens should be assessed as follows:

- Impact on the National, State and Local Road network in the vicinity of the proposed Abel Mine.
- Location, road safety and efficiency / performance of the proposed access intersection/s to the site.

As such, the priority of this assessment is to determine likely daily traffic flows (trip generation) as they are applied to the Beresfield / Thornton road network and an analysis of the safety / efficiency / performance of the access intersection/s to and from the site.

Access to the proposed Abel Mine is proposed to be via the new access intersection to the Donaldson Mine off John Renshaw Drive, approximately 2km west of the F3 Freeway / Weakleys Drive roundabout intersection. This access intersection is currently under construction and will be operational in June 2006. The Donaldson access has been designed as a high standard channelised seagull type intersection with full acceleration and deceleration facilities for all turning movements.

Design parameters used for the Donaldson access dictated that the intersection was designed for heavy vehicle haulage of coal from the Tasman Mine on George Booth Drive at Seahampton. As such the intersection features a long acceleration and deceleration lane to / from the west. On the eastern (or westbound approach) side of the intersection a sheltered deceleration / storage bay is provided for right turn access and an eastbound left turn acceleration lane is also included.

3. Road Network and Existing Traffic Volumes

The road network in the vicinity of the existing Donaldson Mine and the proposed Abel Mine is dominated by the convergence of a number of National and State Highways in the wider Beresfield / Thornton area. This has led to a large increase in the number of industrial estates and commercial developments in the area, particularly since the F3 Freeway was completed to Beresfield in 1996.

The dominant roads through the Beresfield / Thornton area are as follows:

- New England Highway (SH9) between Newcastle (Hexham) and Maitland
- Northern end of F3 Freeway and its dual connections to the New England Highway and Pacific Highway via Weakleys Drive and John Renshaw Drive respectively.
- John Renshaw Drive (MR588), west of the F3 Freeway / Weakleys Drive intersection, which is the major arterial route between Beresfield and the towns of Kurri Kurri and Cessnock.

Of these roads the primary access road for the Donaldson Mine site will become John Renshaw Drive from mid-2006. This is the least important and least trafficked of these roads but it will be the focus of a number of potential developments in coming years and as such may need major upgrading as a result.

3.1 Daily Traffic Volumes

Daily and historical traffic volumes are quoted for a selection of key locations on these roads in Table 3.1. These have been sourced from RTA Traffic Volume publications (2004) and from a recent survey on John Renshaw Drive specifically undertaken for this assessment (2006).

The figures in Table 3.1 demonstrate considerable growth on all of these roads over recent years, with typical six year (1998 – 2004) increases in the range of 35% - 45% equating to annual growth rates in excess of 6% per annum. The exception to this is John Renshaw Drive with a six year growth of 20% for an annual rate of 3.5%.

Table 3.1 RTA Published and Surveyed Traffic Volumes

Road	Location	Count	1998	2001	2004	2006
F3	Sydney to Newcastle Freeway at Black Hill	AADT	23,514	27,917	32,997	
SH9	New England Highway at Thornton	AADT	34,752	42,140	46,623	
SH9	Weakleys Drive Connection F3 – SH9	AADT	13,478	16,826	19,750	
MR588	John Renshaw Drive Connection F3 – SH9	AADT	20,217	22,228	28,020	
MR588	John Renshaw Drive West of Weakleys Drive	Vehicles	6,093	6,501	7,341	7,356

Notes
1. Volumes are Average Annual Daily Traffic (measured Axle Pairs) as shown or Vehicles per Day for John Renshaw Drive
2. John Renshaw Drive 2006 Survey from 31 March 2006 – 7 April 2006
3. John Renshaw Drive 2006 Survey shows 9% HV content.

Surveys of traffic volumes undertaken in early April 2006 show only a modest increase from that of 2004, although seasonal variations have not been incorporated into the most recent survey. This provides an accurate data set of current volumes, vehicle classifications and hourly volume splits on John Renshaw Drive. Copies of the output from this survey are provided in Appendix A of this report.

3.2 Peak Hour Volumes

Peak hour volumes on John Renshaw Drive have been derived from the hourly volume splits of the April 2006 survey and these have been compared with data from a Traffic Study (NTPE, 2001) undertaken for the Donaldson Mine development. The survey for that report was undertaken in July 2000 and the current volumes for peak hour flows represent increases of 21% - 23% over a six year period, generally consistent with the 3.5% per annum growth rate established from RTA figures of 1998 – 2004.

A summary of the peak hour volumes and their respective directional splits is provided in Table 3.2.

Table 3.2 Peak Hour Volumes on John Renshaw Drive

Peak Hour Directional Flow	2000 Survey	2006 Survey
Westbound AM Peak	220 vehicles / hour	250 vehicles / hour
Eastbound AM Peak	350 vehicles / hour	450 vehicles / hour
Total AM Peak	570 vehicles	700 vehicles
AM Tidal Split Westbound / Eastbound	39:61	36:64
Westbound PM Peak	390 vehicles / hour	450 vehicles / hour
Eastbound PM Peak	250 vehicles / hour	330 vehicles / hour
Total PM Peak	640 vehicles	780 vehicles
PM Tidal Split Westbound / Eastbound	61:39	58:42

3.3 Intersection Turning Movements

The Donaldson access intersection is not yet operational and as such no data is available to determine turning movements and subsequent calculation of intersection performance criteria. Projected peak hour usage of the intersection was predicted in the NTPE Traffic Study and these were premised on a number of assumptions in relation to development of the Donaldson site and some adjacent land holdings.

In particular the projected usage of the intersection was to include Stage 1 of the proposed Ashtonfield industrial and commercial development, and some traffic generation from that site was included within the calculations for intersection capacity. An extract copy of the calculations and results of the NTPE Traffic Study is included as Appendix B of this report.

The operating performance of each intersection, as assessed by the intersection simulation programme SIDRA (ARRB, 2002), are summarised in Table 4.2, with key Level of Service (LOS) outputs provided for the Average Delay for each of the daily peak periods. Full details of the SIDRA traffic analysis outputs, including individual movement delays and queue lengths are provided in Appendix C. This appendix also includes the criteria for the assessment of LOS.

4. Predicted Traffic Volumes

The predicted traffic volumes associated with the operation of the proposed Abel Mine are a function of proposed employee numbers, shift rotations, timing of employee arrivals and departures and an estimation of additional, associated traffic generation. This is undertaken on both a daily volume and a peak hour volume basis.

4.1 Daily Traffic Generation

The proposed workforce for the Abel Mine is expected to consist of 375 employees on a 24 hour, three-shift production cycle. It is anticipated that there would be some travel sharing amongst employees and that a vehicle occupation rate of 1.5 persons per vehicle can be expected. This results in a total of 480 vehicle trips per day for employees.

Given that there will be a requirement for a larger day shift and that administration and site management are required, the total employee numbers of employee vehicles are expected to be as shown in Table 4.1.

In addition, there is an expectation of a number of service and delivery vehicles and other visitors to the site. For the purposes of this assessment we have assumed that up to 20 service and delivery vehicles would access the site daily. These would include fuel, machinery servicing, stores, site maintenance and cleaning staff. Visitors to the site would include other company and industry representatives, suppliers and clients. We have estimated the visitation rate to be a conservative 20 per day.

Table 4.1 Employee and Operational Traffic Generation

Employee Category	Projected Vehicles	Time of Travel	Total Trip Numbers
Site Management and Administration	12	Daytime	24
Day Shift	120	Daytime	240
Afternoon / Night Shift	54	Afternoon / Late night	108
Night / Morning Shift	54	Late night / morning	108
Service Vehicles and Deliveries	20	Daytime	40
Visitors and other Miscellaneous Trips	20	Daytime	40
Total Daily Site Visitation	280		560

It is considered that a total of 560 trips to / from the proposed Abel Mine each day is a potential overestimation of actual trips that would be generated, and concentration of these within respective peak hours would be conservative from a traffic analysis perspective. For the purposes of the Abel Mine traffic analysis in Section 5 we have assumed this conservative daily traffic generation of 560 trips per day.

4.2 Traffic Distribution to Existing Road Network

Arrival and departure patterns of vehicles accessing the Abel Mine via the John Renshaw Drive access intersection are projected on the basis of attraction to/from major residential areas in the Newcastle / Lake Macquarie / Maitland / Cessnock area. For the purposes of assigning traffic generated by the

proposed Abel Mine an assumed distribution model has been used. The parameters of this model are set out in Table 4.2. Sensitivity testing on this assumed model is undertaken in Section 5.

Table 4.2 Employee and Operational Traffic Generation

Trip Origin / Destination	Assign	Daily Trips	Road Network Usage
Newcastle Central	25%	140	John Renshaw Drive east / SH9 / SH10
Newcastle West / Lake Macquarie	40%	224	John Renshaw Drive / F3 Freeway south
Maitland	25%	140	John Renshaw Drive / Weakleys Drive / SH9
Kurri Kurri / Cessnock	10%	56	John Renshaw Drive west

4.3 Peak Hour Traffic Generation

Peak hour traffic generation from the proposed Abel Mine would be a subset of the daily flows established in Table 4.1. However, general mining industry starting and finishing times for a three shift production cycle are likely to be off-set from peak periods of other, commuter based, traffic flows which are generally 8am – 9am and 5pm – 6pm.

Once again a conservative assumption has been made that these periods do coincide for employee generated traffic and this would result in a staggered peak period distribution for incoming and outgoing trips as shown in Table 4.3. In this table it has been assumed that service deliveries and visitors would be spread throughout the day and there are fewer trips within peak periods.

Table 4.3 Peak Period Traffic Generation

Employee Category	Total Trips	Time of Travel	AM In	AM Out	PM In	PM Out
Site Management and Administration	24	Daytime	12			12
Day Shift	240	Daytime	120			120
Afternoon / Night Shift	108	Afternoon / Late night			54	
Night / Morning Shift	108	Late night / morning		54		
Service Vehicles and Deliveries	40	Daytime	10			10
Visitors and other Miscellaneous Trips	40	Daytime	10			10
Total Daily Site Visitation	560		152	54	54	152

The directional split of these peak period trips is assumed to be 90% to/from the east and 10% to/from the west in accordance with the network distribution model as shown in Table 4.2.

4.4 Future Traffic Generation

The potential for future traffic generation on the Donaldson site and the Ashtonfield lands is acknowledged but cannot be quantified for the purposes of this assessment. If there are major developments of large parcels of land between John Renshaw Drive and the New England Highway there would need to be separate assessments of these proposals. These developments would most likely require separate new intersections to service these sites.

A major development such as the Ashtonfield proposal would need a separate intersection or interchange on John Renshaw Drive and it may be appropriate for all traffic from that future development to use that facility instead of the partial use of the Donaldson Access as previously provisioned.

Similarly the potential for substantial traffic growth on John Renshaw Drive from developments elsewhere cannot be predicted. Major development in Cessnock or Kurri Kurri could increase traffic growth rates on John Renshaw Drive in the future. A major increase in the role of John Renshaw

Drive could arise out of staging options for the proposed F3 to Branxton project. In the event of this possibility, it is expected that John Renshaw Drive would require duplication to dual carriageway.

None of these possible future traffic growth scenarios for John Renshaw Drive are considered in the context of the Abel Mine traffic and transport assessment.

5. Traffic Analysis of Abel Mine Operation

As outlined in Section 2 this Traffic and Transport Assessment is primarily focussed on assessing the impact that traffic generated by the proposed Abel Mine would have on the operation and performance of the existing road network. This is to be assessed on a daily basis for the road network links in the immediate vicinity of the proposed mine and from a peak period perspective in relation to the Donaldson Access (future Abel Mine) intersection off John Renshaw Drive.

5.1 Daily Road Network Impact

The impact on the road network from projected daily traffic volume increases in the vicinity of the proposal is outlined in Table 5.1. This demonstrates the increase in traffic on each road from the distribution model as proposed in Table 4.2. The additional trips assigned to the network are compared to the 2004 (AADT) figure for comparison purposes. The calculated percentages are again conservative because normal traffic growth on these roads subsequent to 2004 would dilute the calculated percentages when the Abel Mine comes on line in 2007.

Table 5.1 Increased Daily Travel

Road	Location	2004 Count	Additional	Increase
MR588	John Renshaw Drive West of Donaldson Access	7,341	56	0.8%
MR588	John Renshaw Drive East of Donaldson Access	7,341	504	6.9%
F3	Sydney to Newcastle Freeway at Black Hill	32,997	224	0.7%
MR588	John Renshaw Drive Connection F3 – SH9	28,020	140	0.5%
SH9	Weakleys Drive Connection F3 – SH9	19,750	140	0.7%
SH9	New England Highway at Thornton	46,623	140	0.3%

The majority of percentage increases shown in Table 5.1 are below 1%. This demonstrates that the potential impact from the Abel Mine is negligible on most roads in the Beresfield / Thornton area, with the assessed percentage increases representing less than of one year of natural growth on these roads. In relation to the sensitivity of the distribution model it is clear that any incorrect assumptions with respect to distribution of traffic would have little impact on the percentage increase figures.

The only substantive increase in daily travel is a predicted 6.9% increase on John Renshaw Drive between the F3 / Weakleys Drive roundabout and the Donaldson Access intersection. This increase represents approximately 2 years of annual growth, but there are no developments or accesses over this 2km length, and there are no current capacity and safety issues on that section of road at present.

5.2 Donaldson / Abel Access - Peak Hour Intersection Performance

The performance of the access intersection was analysed in the NTPE Traffic Study for the Donaldson Mine development as operational in 2011. The peak hour through movements on John Renshaw Drive from the July 2000 survey were increased by 3% per annum and the intersection turning movements as analysed included traffic generated by the following:

- Operation of Donaldson Mine
- Coal haulage by road from Tasman Mine
- Future developments on the adjacent Ashtonfield Industrial and Commercial area

Of these it was apparent that the majority of turning movements were generated by the futuristic Ashtonfield industrial and commercial area, which at the time of this report was apparently no closer to being developed.

The projected through and intersection turning movements as analysed by NTPE are replicated in Table 5.2 below and the analysis is repeated to ensure consistency and adequate calibration with separate analyses now undertaken for the future Abel Mine operation.

The operating performance of the intersection, as assessed by the intersection simulation programme aaSIDRA (ARRB, 2002), is summarised key Average Delay and Level of Service (LOS) outputs provided for each movement for each of the daily peak periods. Full details of the SIDRA traffic analysis inputs and outputs are provided in Appendix C.

Table 5.2 Predicted Donaldson Mine Intersection 2011 (comparison with NTPE, 2001)

Intersection Movement	AM Peak			PM Peak		
	Volume	Ave Delay	LOS	Volume	Ave Delay	LOS
Westbound through	293	0.0 sec	A	519	0.0 sec	A
Donaldson right in	103	16.2 sec	C	43	15.2 sec	C
Eastbound through	465	0.0 sec	A	333	0.1 sec	A
Donaldson left in	97	14.2 sec	B	48	14.6 sec	B
Donaldson right out	52	28.2 sec	D	93	21.6 sec	C
Donaldson left out	47	21.0 sec	C	99	18.9 sec	C
Intersection Performance			A			A

Notes
1. Turning movement volume is inclusive of assessed HV volume – see SIDRA output for detail.
2. Delay calculations quoted as Average Delay per Vehicle.
3. Level of Service (LOS) quoted for each movement and intersection as whole.

These results are comparable to those produced by NTPE for the initial evaluation of the Donaldson Access intersection. A review of NTPE Tables 5.1 and 5.2 in Appendix B shows very similar results for Average Delays and Level of Service. Any variances can be attributed to minor variations in assigned intersection geometry and software input variables.

As part of the analysis of the future operation of the Donaldson Mine access we have tested the access intersection across a range of operational scenarios for turning movement demand as follows:

- Scenario 1 Abel Mine operational in 2007 in conjunction with Donaldson Mine operations and Tasman Mine haulage commenced.
- Scenario 2 Abel Mine operational in 2012 with Donaldson Mine complete and Tasman Mine haulage continuing.
- Scenario 3 Abel Mine operational in 2017 with Ashtonfield Stage 1 in place and Tasman Mine haulage continuing.
- Scenario 4 Abel Mine operational in 2017 with Tasman Mine haulage only.

Each of these scenarios has been modelled in SIDRA and the results are provided in Tables 5.3 – 5.6.

Table 5.3 Abel Mine Operation - Scenario 1 (2007)

Intersection Movement	AM Peak			PM Peak		
	Volume	Delay	LOS	Volume	Delay	LOS
Westbound through	258	0.0 sec	A	464	0.1 sec	A
Donaldson right in	143	14.5 sec	B	51	13.7 sec	B
Eastbound through	463	0.1 sec	A	340	0.0 sec	A
Donaldson left in	34	15.0 sec	B	20	16.3 sec	C
Donaldson right out	24	28.8 sec	D	30	22.6 sec	C
Donaldson left out	55	18.3 sec	C	139	16.4 sec	C
Intersection Performance			A			A

Table 5.4 Abel Mine Operation - Scenario 2 (2012)

Intersection Movement	AM Peak			PM Peak		
	Volume	Delay	LOS	Volume	Delay	LOS
Westbound through	295	0.0 sec	A	531	0.1 sec	A
Donaldson right in	137	14.9 sec	B	49	13.9 sec	B
Eastbound through	531	0.1 sec	A	389	0.0 sec	A
Donaldson left in	28	15.4 sec	C	18	16.7 sec	C
Donaldson right out	18	32.4 sec	D	28	23.8 sec	C
Donaldson left out	49	19.7 sec	C	137	17.4 sec	C
Intersection Performance			A			A

Table 5.5 Abel Mine Operation - Scenario 3 (2017)

Intersection Movement	AM Peak			PM Peak		
	Volume	Delay	LOS	Volume	Delay	LOS
Westbound through	333	0.0 sec	A	599	0.1 sec	A
Donaldson right in	234	17.5 sec	C	90	15.2 sec	C
Eastbound through	599	0.1 sec	A	439	0.0 sec	A
Donaldson left in	106	14.7 sec	B	51	14.7 sec	B
Donaldson right out	51	47.2 sec	E	106	28.5 sec	D
Donaldson left out	90	26.1 sec	D	241	25.2 sec	D
Intersection Performance			A			B

Table 5.6 Abel Mine Operation - Scenario 4 (2017)

Intersection Movement	AM Peak			PM Peak		
	Volume	Delay	LOS	Volume	Delay	LOS
Westbound through	333	0.0 sec	A	599	0.1 sec	A
Donaldson right in	137	15.3 sec	C	49	14.2 sec	B
Eastbound through	599	0.1 sec	A	439	0.0 sec	A
Donaldson left in	28	15.4 sec	C	18	16.7 sec	C
Donaldson right out	18	34.8 sec	D	28	25.0 sec	C
Donaldson left out	49	21.3 sec	C	137	18.9 sec	C
Intersection Performance			A			A

These SIDRA analyses demonstrate that the peak hour traffic flows on John Renshaw Drive would not be adversely affected by turning movements to and from the Donaldson (Abel) Mine access intersection. All peak hour through movements maintain LoS A with negligible delays in all four modelled scenarios. The substantially higher volumes on these movements result in identical LoS A indicators for overall intersection performance under three of these operating scenarios and LoS B for the most extreme Scenario 3.

Turning movement delays are most notable on right turn exit movements from the access intersection. A worst case result as portrayed in Scenario 3 is for significant delays and LoS E for this movement in 2017 with Abel Mine operations, Tasman Mine haulage continuing and some assumed traffic from the Ashtonfield site using the intersection. Elimination, or re-direction, of the Ashtonfield traffic elsewhere, as portrayed in Scenario 4, results in these delays being reduced.

6. Summary and Conclusions

The proposed Abel Mine, to be situated south of the existing Donaldson Mine at Beresfield, is proposed to produce 4.5 million tonnes of coal per annum. All site infrastructure for the Abel Mine would be within the existing Donaldson Mine lease area. All coal mined and processed for the Abel Mine would be transported to the Port of Newcastle by rail. As such this Traffic and Transport Assessment has focussed on the road traffic generation from the future operation of the Abel Mine and its impact on the existing road network.

Operation of the Abel Mine is expected to generate a maximum of 560 vehicular trips per day on to the existing road network. This trip generation will be via the soon to be completed Donaldson Access intersection on John Renshaw Drive, approximately 2km west of the F3 Freeway / Weakleys Drive roundabout. This intersection is to be a high standard channelised t-intersection with long deceleration and acceleration facilities for traffic entering and leaving the Donaldson Mine access.

The impact of the 560 additional trips on key roads in the Beresfield / Thornton area has been assessed as negligible, with increases below 1% on most roads representing less than one year of natural growth rates which are currently in the order of 6%. The exception to this is John Renshaw Drive itself, east of the access intersection where a 6.9% increase in traffic can be expected before the increase is dissipated to other roads with higher base volumes. The increase on John Renshaw Drive is unlikely to have any noticeable impact on the capacity and road safety of that section of road or the operation of the roundabout intersection at the northern end of the F3 Freeway.

Consideration of the future operating performance of the Donaldson (Abel) Mine access intersection has been undertaken with the following inputs:

- Continued natural traffic growth on John Renshaw Drive at 3%p.a.
- Continuation of Donaldson Mine operations until 2011.
- Road haulage of coal from the Tasman Mine commencing in 2006 and continuing until 2017.
- Abel Mine operational as early as 2007 and continuing to 2017 and beyond.
- Inclusion of some traffic from the Ashtonfield site (as per earlier NTPE Traffic Study) after 2012 but before 2017.

The results derived from a series of operating scenarios confirm that the through traffic movements and overall intersection performance would be satisfactory to 2017 and beyond. This analysis has not considered any major functional change to the status of John Renshaw Drive within the National Highway and State Road networks.

Delays arising for traffic entering and exiting the access intersection have been calculated and these are generally satisfactory, with LoS B or LoS C for most turning movement scenarios. The exceptions are potentially significant delays for right turns out of the access intersection, heading west on John Renshaw Drive. These calculated delays can be reduced by re-direction of potential traffic from the futuristic Ashtonfield development to a dedicated access facility elsewhere on John Renshaw Drive.

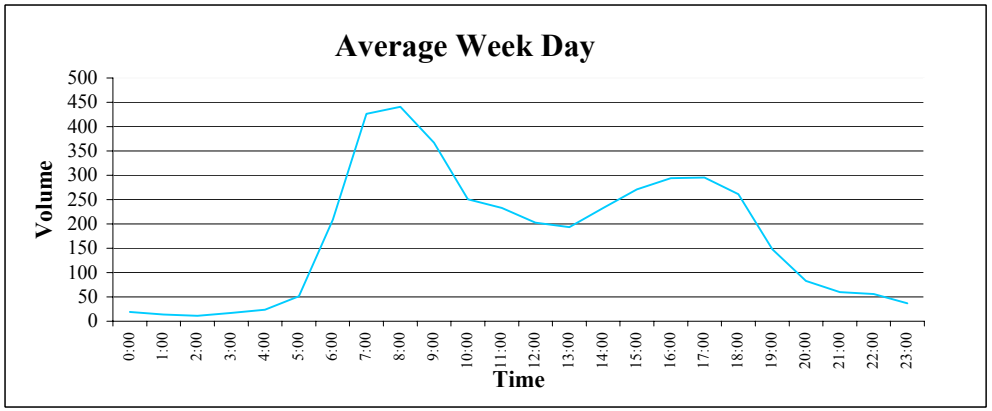
As a result of these analyses it is concluded that the future operation of the proposed Abel Mine is unlikely to have an adverse impact on the existing road network or the key access intersection to the internal site infrastructure and surface facilities. The access to the proposed mine from John Renshaw Drive would perform adequately under all operating scenarios for at least ten years after a possible mine opening next year, that is up to 2017.

Appendix A

Surveyed Traffic Volumes – John Renshaw Drive (April 2006)

John Renshaw Drive, 1km East of Blackhill Road — Eastbound

Day	Fri	Sat	Sun	Mon	Tue	Wed	Thu	Fri	W/Day	W/End	7 Day
Time	31-Mar-06	1-Apr-06	2-Apr-06	3-Apr-06	4-Apr-06	5-Apr-06	6-Apr-06	7-Apr-06	Ave.	Ave.	Ave
0:00		25	58	14	19	14	25	23	19	42	25
1:00		15	23	8	11	10	17	24	14	19	15
2:00		10	6	9	11	11	15	11	11	8	10
3:00		21	8	14	16	15	21	21	17	15	17
4:00		16	6	24	27	25	18	25	24	11	20
5:00		91	15	50	56	52	50	47	51	53	52
6:00		106	54	213	215	199	203	212	208	80	172
7:00		109	78	445	446	426	415	400	426	94	331
8:00		185	71	439	472	447	428	418	441	128	351
9:00		219	111	362	359	387	362	365	367	165	309
10:00		221	182	270	252	232	238	260	250	202	236
11:00		274	211	228	211	227	235	263	233	243	236
12:00		179	228	193	194	198	204	223	202	204	203
13:00		175	230	178	189	179	191	229	193	203	196
14:00	285	187	218	188	214	244	234		233	203	224
15:00	293	150	206	268	267	270	256		271	178	244
16:00	291	160	178	313	296	274	297		294	169	258
17:00	260	219	208	286	268	328	335		295	214	272
18:00	173	169	168	269	296	303	266		261	169	235
19:00	126	96	110	141	154	135	183		148	103	135
20:00	89	67	62	91	68	67	98		83	65	77
21:00	66	65	50	60	56	69	48		60	58	59
22:00	61	55	44	47	55	52	65		56	50	54
23:00	42	55	21	29	35	43	35		37	38	37
Total	**1686**	**2869**	**2546**	**4139**	**4187**	**4207**	**4239**	**2521**	**4196**	**2708**	**3771**

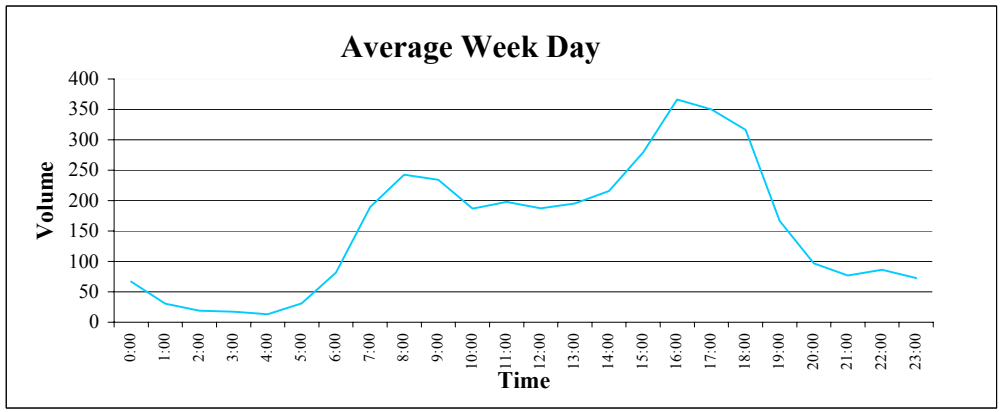


Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	**472**
PM Peak	5:00 PM	6:00 PM	**335**
		Week Day Average	**4196**
		Weekend Day Average	**2708**
		7 Day Average	**3771**

John Renshaw Drive, 1km East of Blackhill Road — Westbound

Day	Thu	Fri	Sat	Sun	Mon	Tue	Wed	Thu	W/Day	W/End	7 Day
Time	31-Mar-06	1-Apr-06	2-Apr-06	3-Apr-06	4-Apr-06	5-Apr-06	6-Apr-06	7-Apr-06	Ave.	Ave.	Ave
0:00		57	48	12	59	64	70	84	67	30	56
1:00		28	39	16	27	26	36	36	31	28	30
2:00		25	9	7	16	16	21	18	19	8	16
3:00		12	17	7	14	12	27	23	18	12	16
4:00		14	15	10	11	9	16	16	13	13	13
5:00		50	16	24	25	31	28	21	31	20	28
6:00		68	25	74	89	83	81	87	82	50	72
7:00		114	46	230	197	204	209	223	189	138	175
8:00		126	85	249	260	285	266	276	243	167	221
9:00		161	103	258	257	226	263	264	234	181	219
10:00		205	140	196	195	165	176	193	187	168	181
11:00		229	185	197	205	158	190	207	198	191	196
12:00		233	177	197	186	170	172	176	187	187	187
13:00		210	170	214	188	163	207	209	195	192	194
14:00	282	204	179	220	203	198	191		216	200	211
15:00	384	199	189	265	252	289	274		280	227	265
16:00	395	175	221	398	433	429	400		366	310	350
17:00	370	171	191	456	395	426	388		350	324	342
18:00	252	125	292	387	455	394	355		316	340	323
19:00	110	92	145	227	192	207	233		167	186	172
20:00	96	59	80	114	102	124	102		97	97	97
21:00	77	60	58	85	81	75	92		77	72	75
22:00	84	87	53	74	89	79	93		86	64	80
23:00	86	72	31	58	75	66	64		73	45	65
Total	**2136**	**2776**	**2514**	**3975**	**4006**	**3899**	**3954**	**1833**	**3721**	**3245**	**3585**



Summary

	from	to	
AM Peak	8:00 AM	9:00 AM	**285**
PM Peak	5:00 PM	6:00 PM	**456**
		Week Day Average	**3721**
		Weekend Day Average	**3245**
		7 Day Average	**3585**

Appendix B

NTPE Traffic Study (2001) – Donaldson Access Intersection

Wootmac

The Donaldson Project

Proposed Coal Mine Access Road

TRAFFIC IMPACT STUDY

Long Term Access to John Renshaw Drive

Prepared by

Northern Transport Planning and Engineering Pty Ltd

A.B.N. 79 056 088 629

May, 2001

99323

1. INTRODUCTION

This report deals with the long traffic impact of the proposed Donaldson Coal Mine. During the initial setting up of the mine site access will be via Four Mile Creek Road. However, within 12 months of commencing operations on the site it is proposed that a permanent access be established to connect to John Renshaw Drive.

The majority of staff and service vehicles accessing the site would use the proposed ultimate access to John Renshaw Drive. While all coal extracted from the Donaldson Project will be transported from the site by rail, provision will also be made for potential future haulage to the site from other areas.

The RTA has indicated that the proposed intersection should provide the capacity to accommodate traffic generated by the first stage of the adjoining Ashtonfield site. Negotiations are being held with the developers of the Ashtonfield site to coordinate these access arrangements.

2. DESIGN HOUR

The proposed coal mine will operate with three shifts starting at about 7am, 3pm and 12 mid-night.

It is expected that the main conflict between trips generated by the development and existing traffic will be between 2.30pm and 3.30pm.

However, activities associated with the potential haulage of coal to the site and the potential commercial/industrial land uses on the Ashtonfield will tend to generate trips during typical AM and PM peak hours of 8am to 9am and 4.30pm to 5.30pm respectively.

Accordingly it is proposed that the following peak hours be adopted as the design hours for assessing the performance of the proposed access:

AM Peak	8am to 9am
PM Peak	4.30pm to 5.30pm

3. EXISTING TRAFFIC – JOHN RENSHAW DRIVE

John Renshaw Drive carries significant traffic flows during both the AM and PM peak hours. Attached, as Appendix A is a report of the results obtained from a survey of traffic flows on John Renshaw Drive west of Leneghans Drive in July 2000.

A summary of the results of this survey are presented in Table 3-1 below:

Table 3-1: Typical Peak Hour Flows – John Renshaw Drive

		AM Peak	PM Peak
John Renshaw Drive West of Leneghans Drive	Eastbound	350	250
	Westbound	220	390

4. PREDICTED TRIP GENERATION FROM PROPOSED DEVELOPMENT

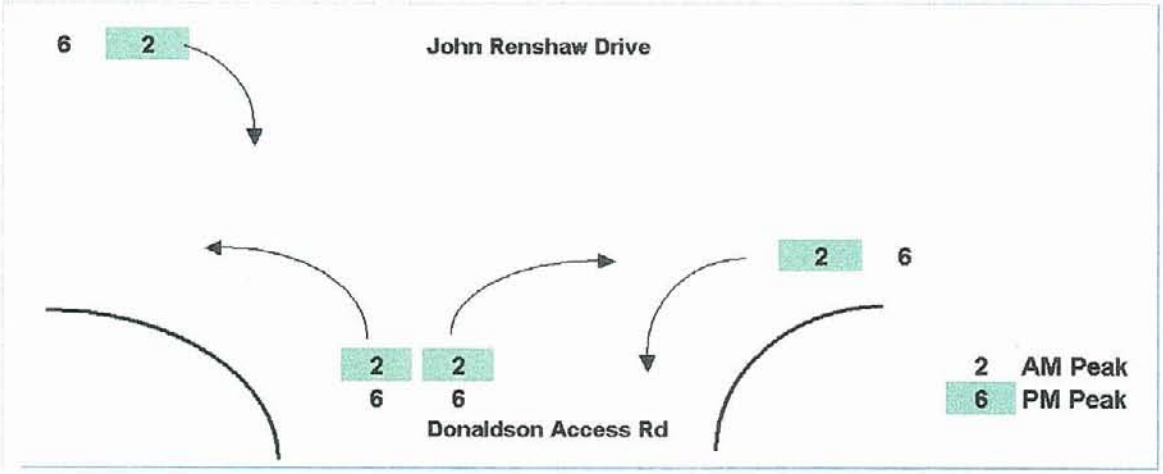
As detailed earlier all coal will be transported from the site by rail. However, consideration will be given to the following trip generation sources:

Donaldson Mine Site
Potential haulage of coal to site for transfer to rail
Ashtonfield Site

4.1 Donaldson Mine Site

The operation of the mine will be plant intensive and will require minimal staff numbers. Accordingly, based on experience gained from other similar mines (see attached details in Appendix B) it is expected that the peak hour trips generated both during the construction and mining stages will be those shown in Figure 4-1 below:

Figure 4-1: Predicted Peak Hour Trip Generation during Construction and Mining Stages of the Proposed Development

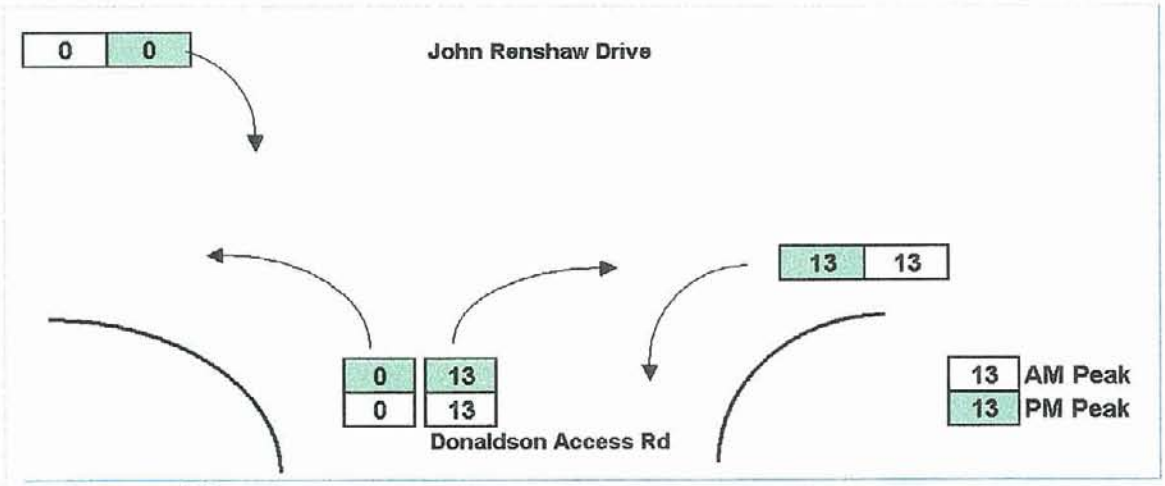


4.2 Proposed Coal Haulage

It is anticipated that up to 4000 tonnes of coal will be transported to the site per day. This would result in up to 26 heavy vehicle movements per hour.

Figure 4-2 below shows predicted peak trip generation for proposed coal haulage from the west:

Figure 4-2: Predicted Heavy Vehicle Peak Hour Trip Generation during Construction and Mining Stages of the Proposed Development



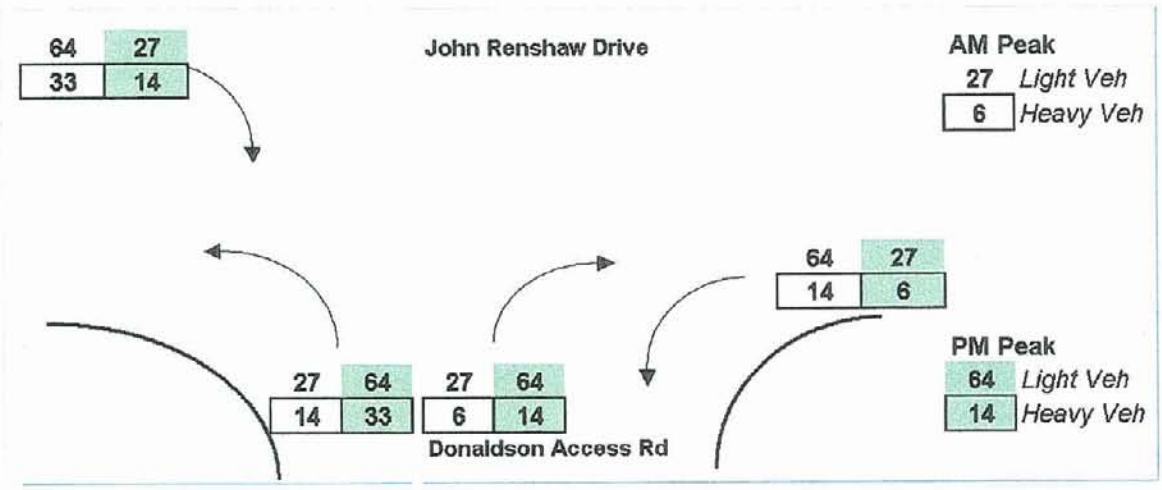
4.3 Ashtonfield Site

The Ashtonfield site has the potential to accommodate up to 3000 hectares of commercial/industrial type land use. Future access to this site is proposed via a grade-separated interchange to John Renshaw Drive near Buchanan. Attached as Appendix D are predicted trip generation estimates provided by GHD for the proposed development of the Ashtonfield Site through to the year 2020. The 2050 daily trips predicted for year 2010 is equivalent to the development of approximately 40000 sq metres of light industrial/commercial land.

For the purpose of this assessment it has been assumed that approximately 50000 sq metres of light industrial/commercial will be developed within the next 10 years generating a total of 2500 trips per day.

Figure 4-3 below shows predicted peak trip generation from Stage 1 of the Ashtonfield site:

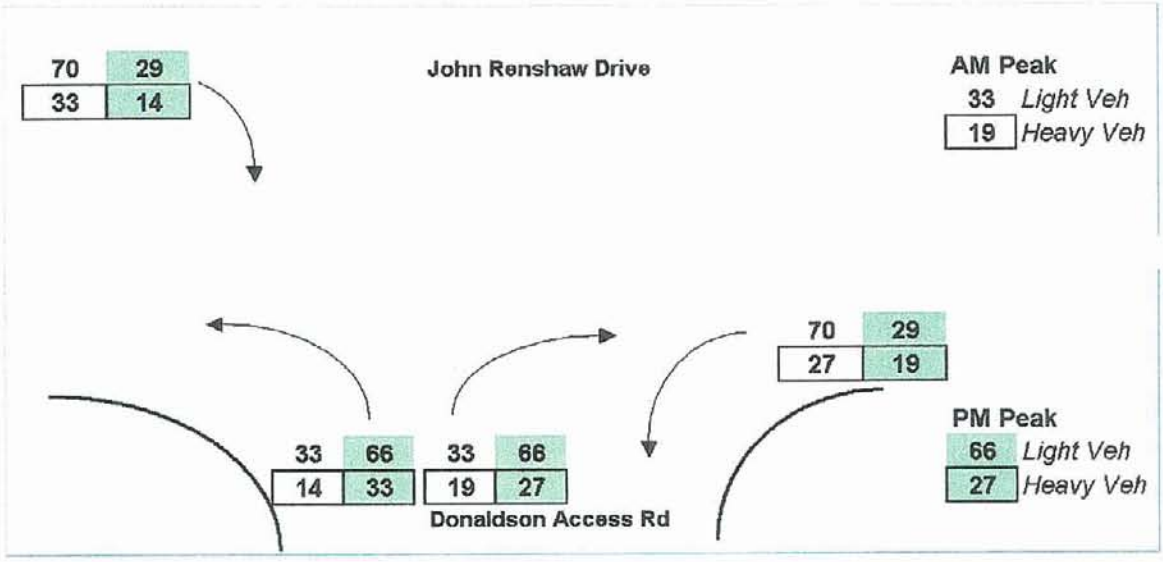
Figure 4-3: Predicted Peak Hour Trip Generation during Stage 1 of Ashtonfield Site



4.4 Total Trip Generation

The combined trip generation of the various components detailed above has been added to existing background traffic flows to predict turning movements at the proposed intersection as detailed in Figure 4-4 below:

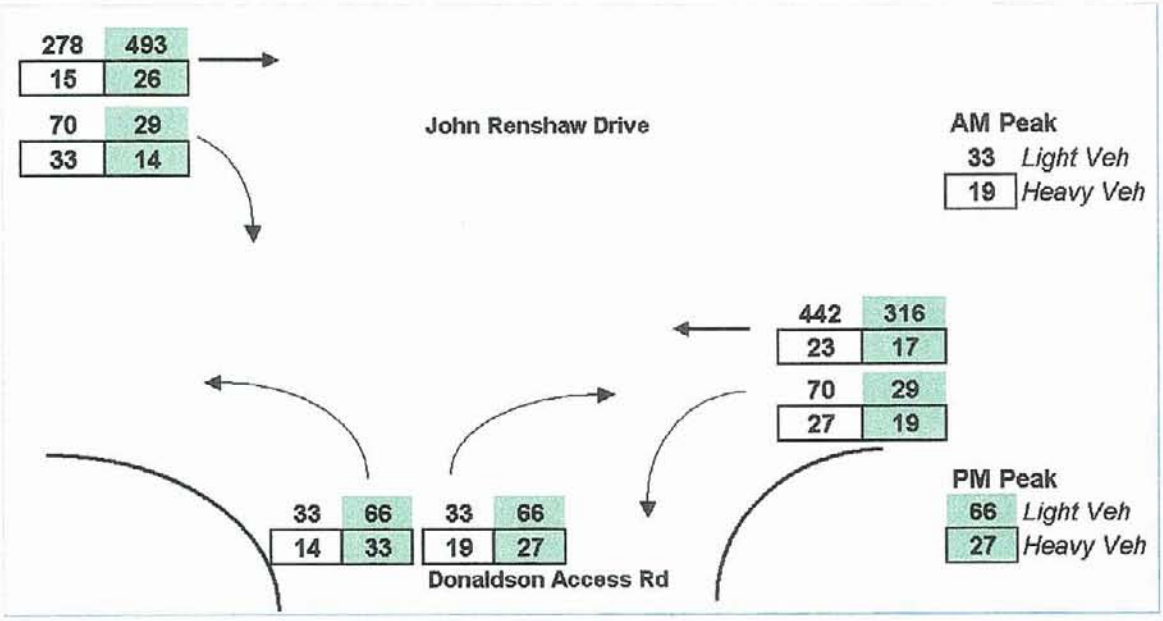
Figure 4-4: Peak Hour Turning Movements – Proposed Access to Donaldson Mine YEAR 2011



The proposed coalmine has an expected life of up to 10 years. The site will then be rehabilitated and opened up for other uses. In order to assess the proposed access consideration has been given to future traffic flows by assuming that existing traffic volumes continue to grow at 3% per year from 2000 to 2011.

Figure 4-5 below presents the predicted traffic flows for the year 2011.

Figure 4-5: Peak Hour Turning Movements – Proposed Access to Donaldson Mine YEAR 2011 Including Growth in Existing Through Traffic



5. INTERSECTION ANLAYSIS

5.1 Intersection Layout

Type C seagull intersection layout as detailed in the concept plan attached as Appendix B has been used to assess the performance of the proposed access. This layout will include 150 metre long right turn and left turn deceleration lanes in John Renshaw Drive.

5.2 SIDRA Analysis

SIDRA has been used to assess the performance of the Type C intersection treatment for the Proposed Access Road and John Renshaw Drive.

Table 5-1 below presents a summary of the results obtained from the SIDRA analysis:

Table 5-1: SIDRA Analysis – Proposed Access Road / John Renshaw Drive Year 2011

Period	Approach		Vehicles	Average Delay (sec)	LOS	Maximum Queue (m)
AM	Eastern	Thru	293	0	A	0
Design		Right	103	22.2	C	2
Hour	Western	Thru	466	8.3	A	0
		Left	97	19.5	C	0
	Northern	Left	47	17.6	C	4
		Right	52	22.9	C	7

Period	Approach		Vehicles	Average Delay (sec)	LOS	Maximum Queue (m)
PM	Eastern	Thru	519	0	A	0
Design		Right	43	21.4	C	1
Hour	Western	Thru	333	8.7	A	0
		Left	48	21.1	C	0
	Northern	Left	99	15.6	C	8
		Right	93	17.5	C	8

5.3 Discussion

This analysis shows that the proposed access will be able to accommodate the predicted traffic flows generated by the proposed development through to the year 2011.

A level of service C is achieved on all approaches during both the AM and PM peak hours.

6. RECOMMENDATION

The proposed Type C sea gull intersection treatments be provided at the access to John Renshaw Drive to manage traffic flows generated by the proposed Donaldson Mine and other identified activities.

Accordingly it is recommended that this long-term access arrangement for the Donaldson Mine be approved.

Appendix C

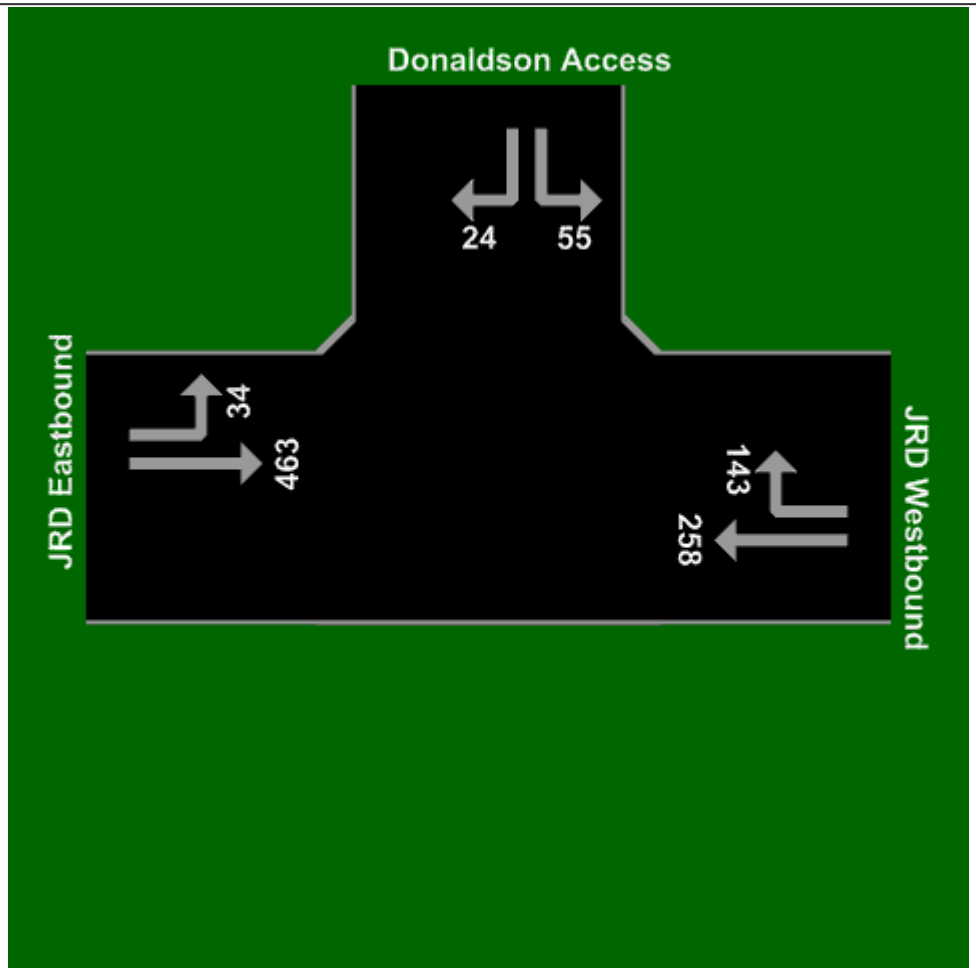
SIDRA Outputs – Donaldson / Abel Access Intersection

Input Volumes

akcelik & associates
aaTraffic SIDRA

Total flow rates as given by the user (veh/60 min)

Donaldson Access - Scenario 1 (2007) AM Peak



Intersection Type

Two-way stop

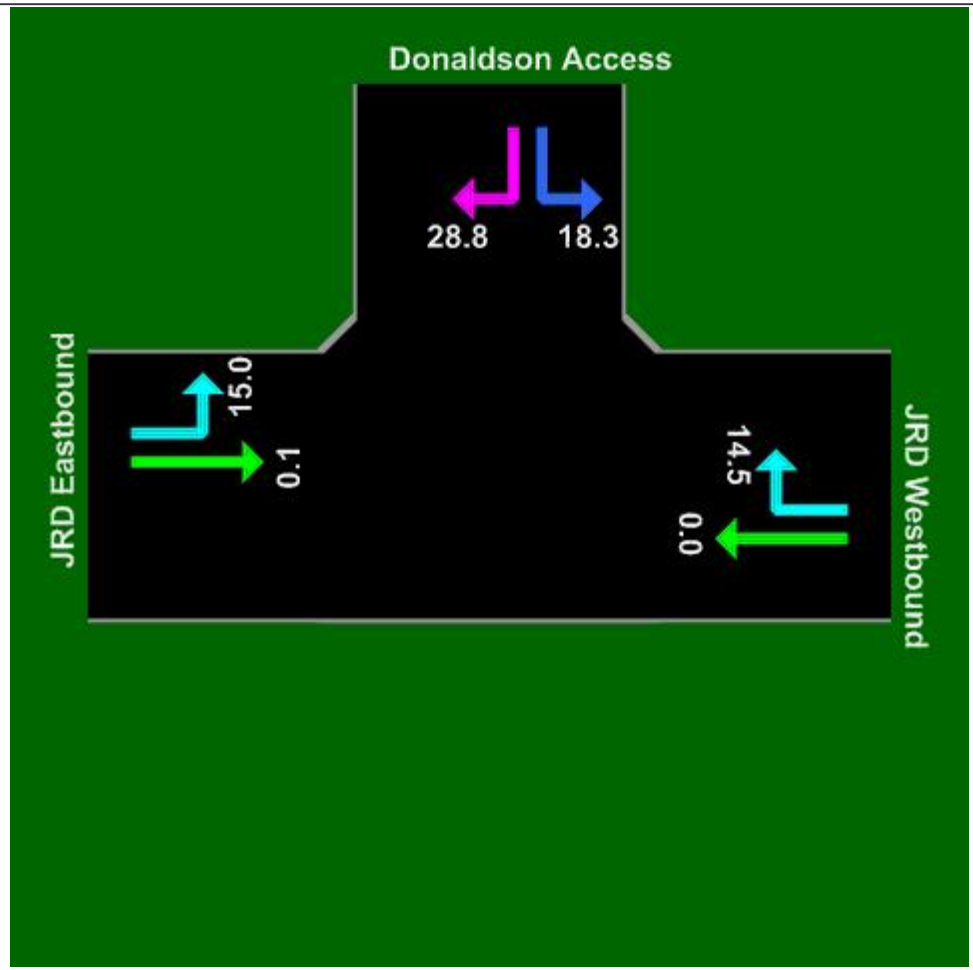
No color code in this display

Control Delay (Average)

akcelik & associates
aaTraffic SIDRA

Average control delay per vehicle (seconds)

Donaldson Access - Scenario 1 (2007) AM Peak



Intersection Type

Two-way stop

Color code based on Level of Service

Continuous movement LOS based on density.

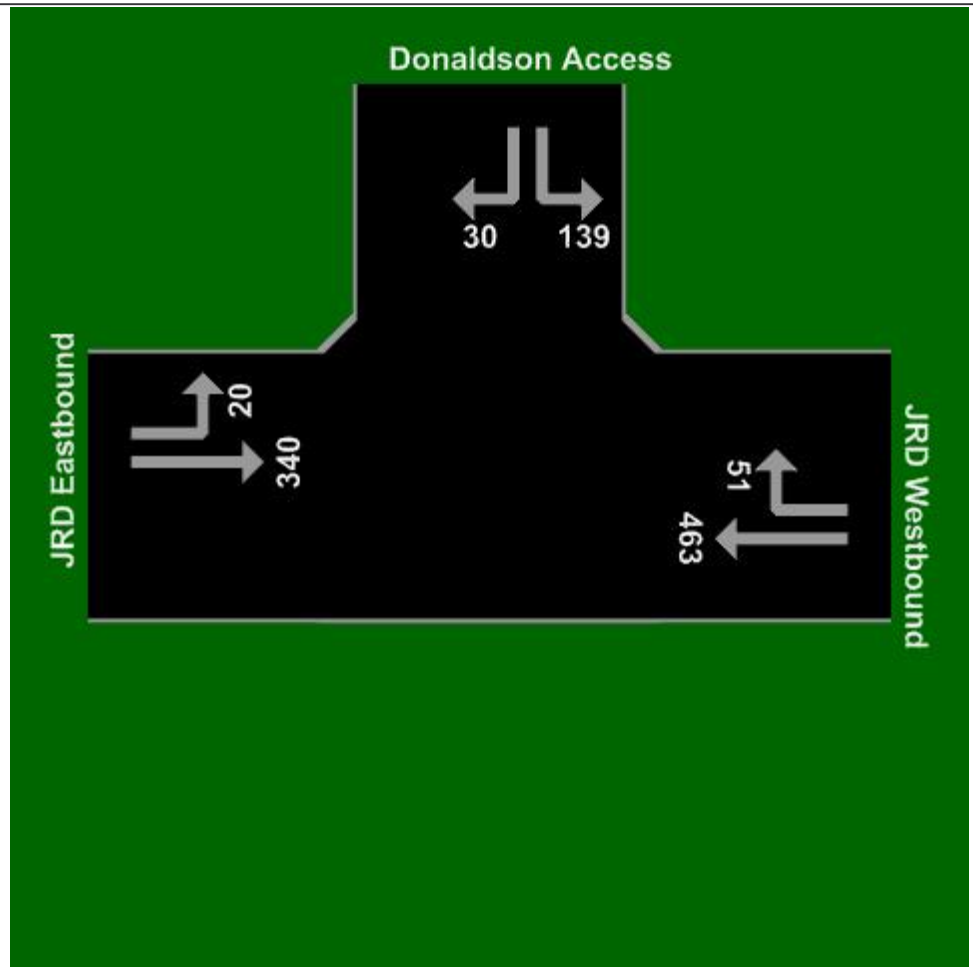
- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

Input Volumes

akcelik & associates
aaTraffic SIDRA

Total flow rates as given by the user (veh/60 min)

Donaldson Access - Scenario 1 (2007) PM Peak



Intersection Type

Two-way stop

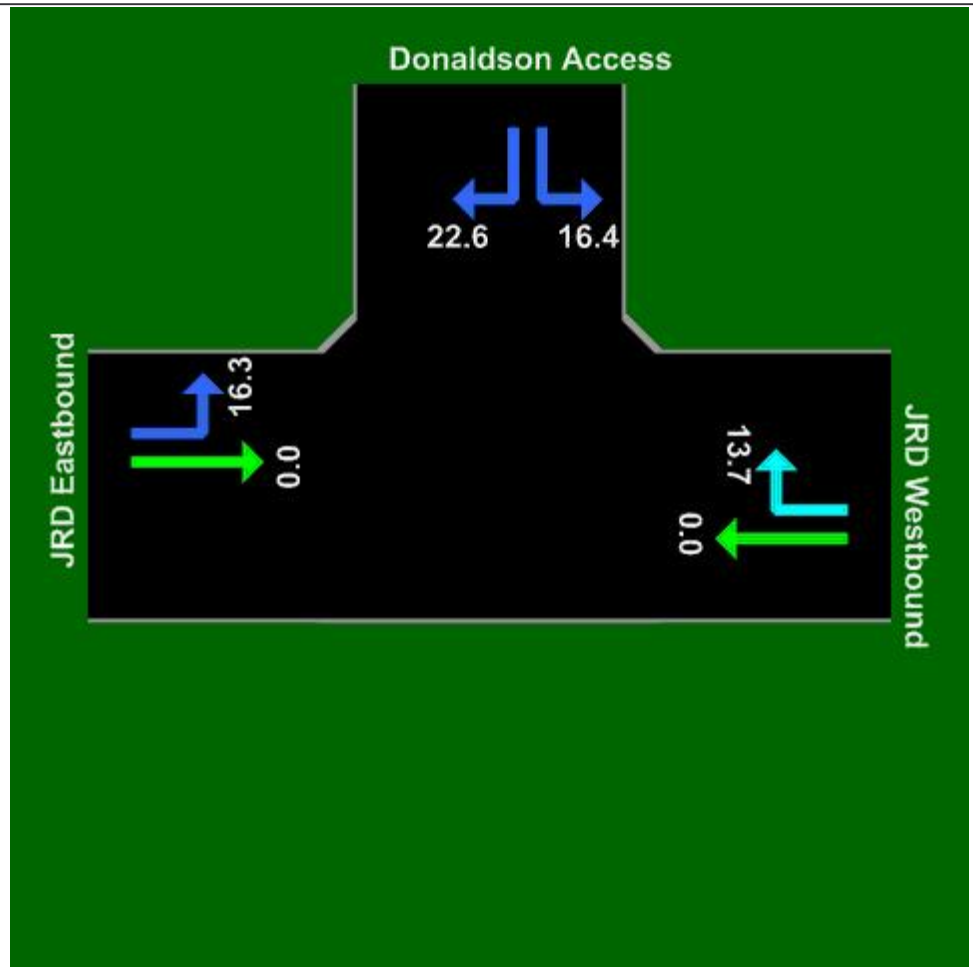
No color code in this display

Control Delay (Average)

akcelik & associates
aaTraffic SIDRA

Average control delay per vehicle (seconds)

Donaldson Access - Scenario 1 (2007) PM Peak



Intersection Type

Two-way stop

Color code based on Level of Service

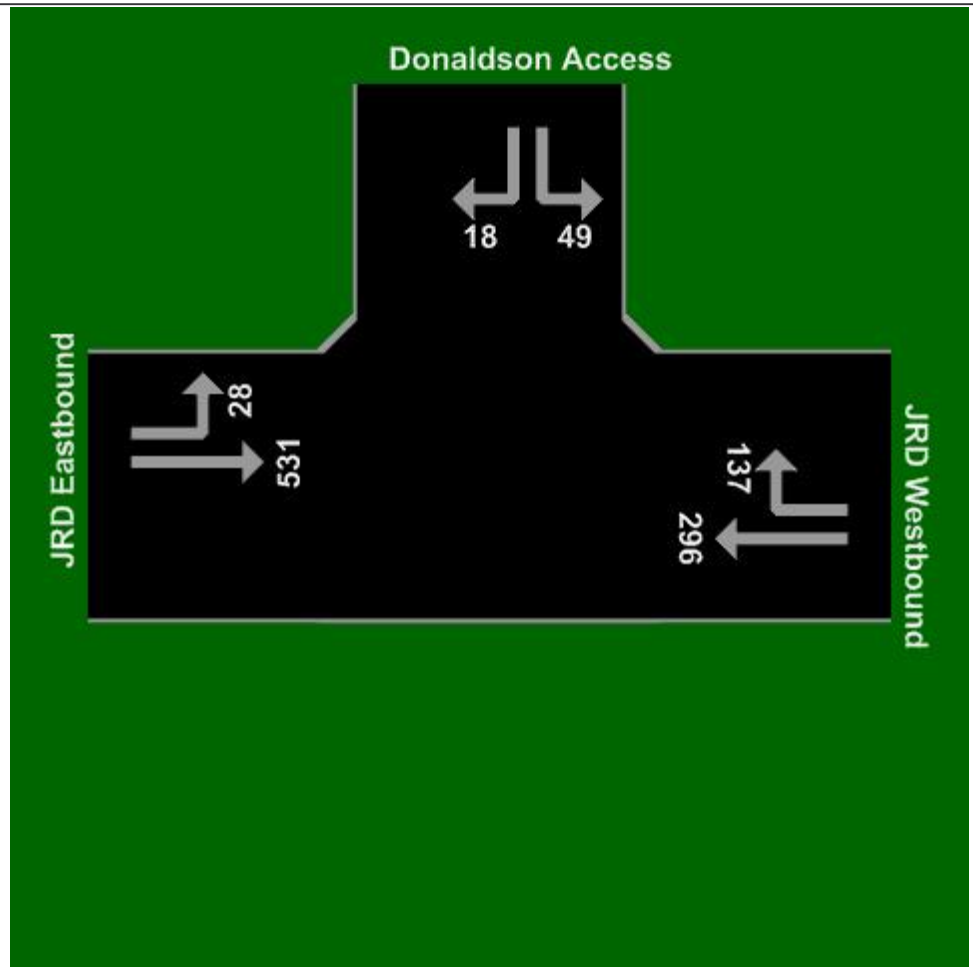
Continuous movement LOS based on density.

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

Input Volumes

Total flow rates as given by the user (veh/60 min)

Donaldson Access - Scenario 2 (2012) AM Peak



Intersection Type

Two-way stop

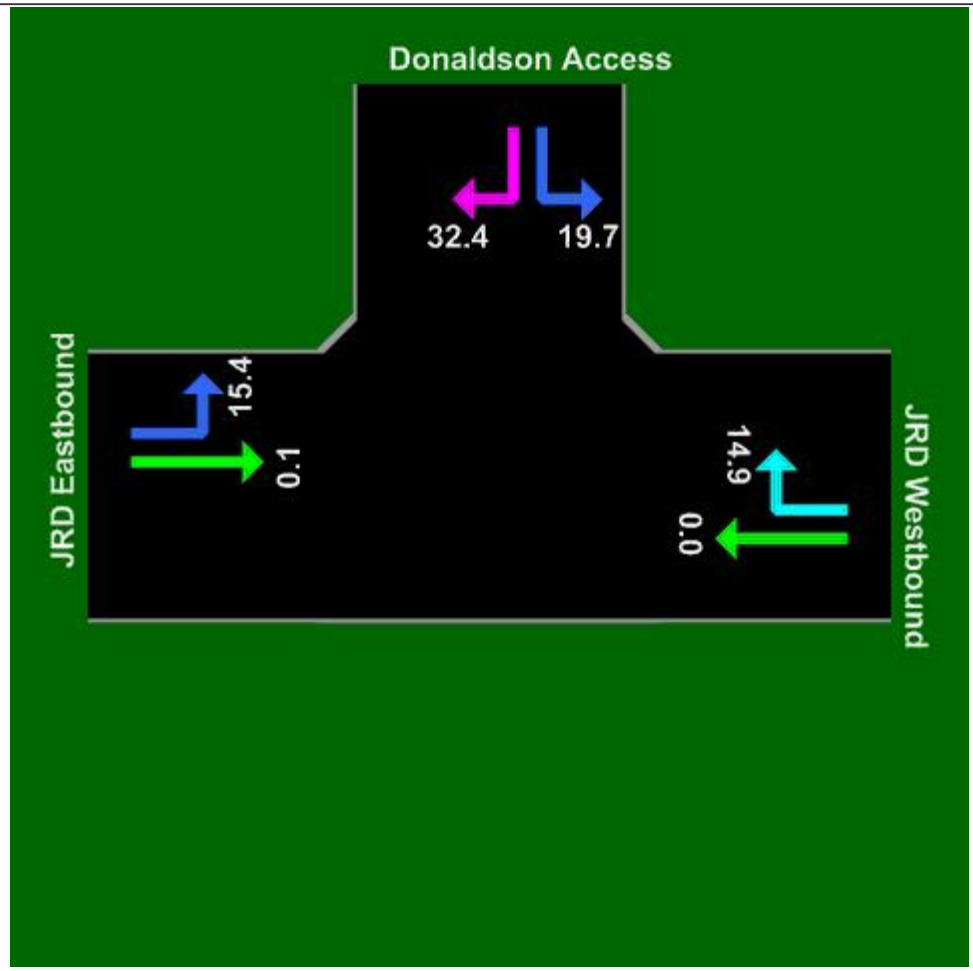
No color code in this display

Control Delay (Average)

akcelik & associates
aaTraffic SIDRA

Average control delay per vehicle (seconds)

Donaldson Access - Scenario 2 (2012) AM Peak



Intersection Type

Two-way stop

Color code based on Level of Service

Continuous movement LOS based on density.

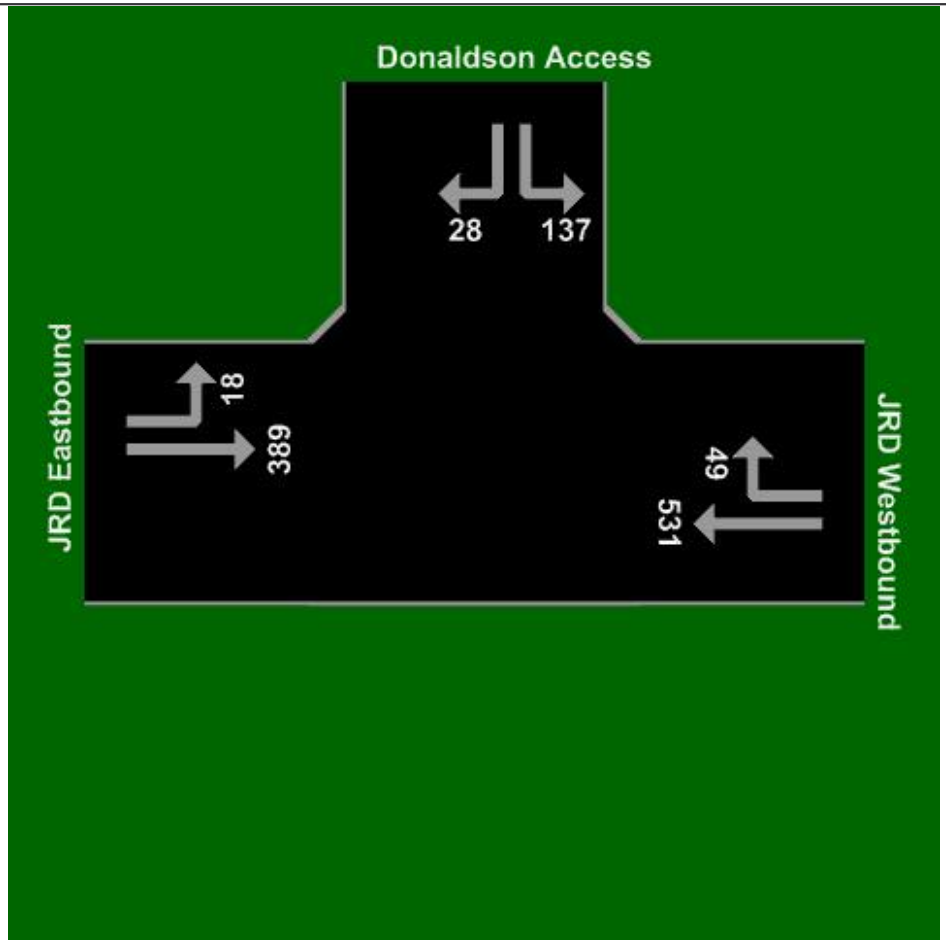
LOS A
LOS B
LOS C
LOS D
LOS E
LOS F

Input Volumes

akcelik & associates
aaTraffic SIDRA

Total flow rates as given by the user (veh/60 min)

Donaldson Access - Scenario 2 (2012) PM Peak



Intersection Type

Two-way stop

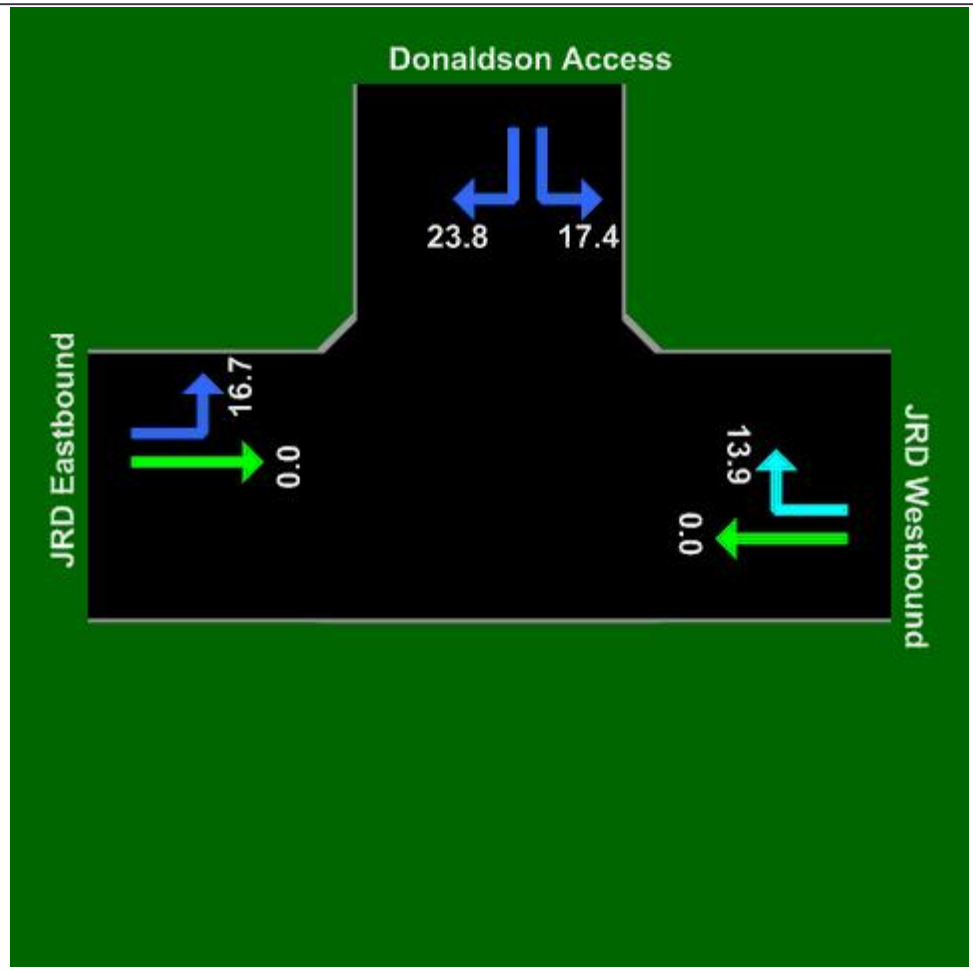
No color code in this display

Control Delay (Average)

akcelik & associates
aaTraffic SIDRA

Average control delay per vehicle (seconds)

Donaldson Access - Scenario 2 (2012) PM Peak



Intersection Type

Two-way stop

Color code based on Level of Service

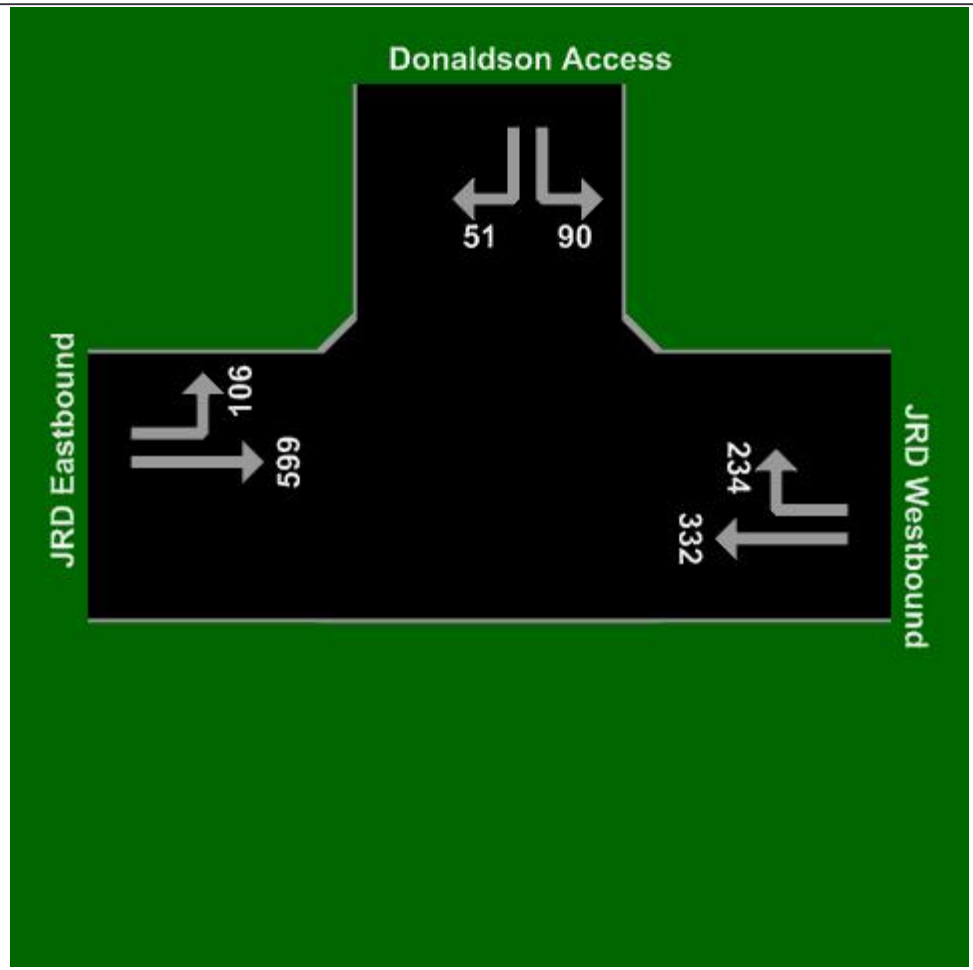
Continuous movement LOS based on density.

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

Input Volumes

Total flow rates as given by the user (veh/60 min)

Donaldson Access - Scenario 3 (2017) AM Peak



Intersection Type

Two-way stop

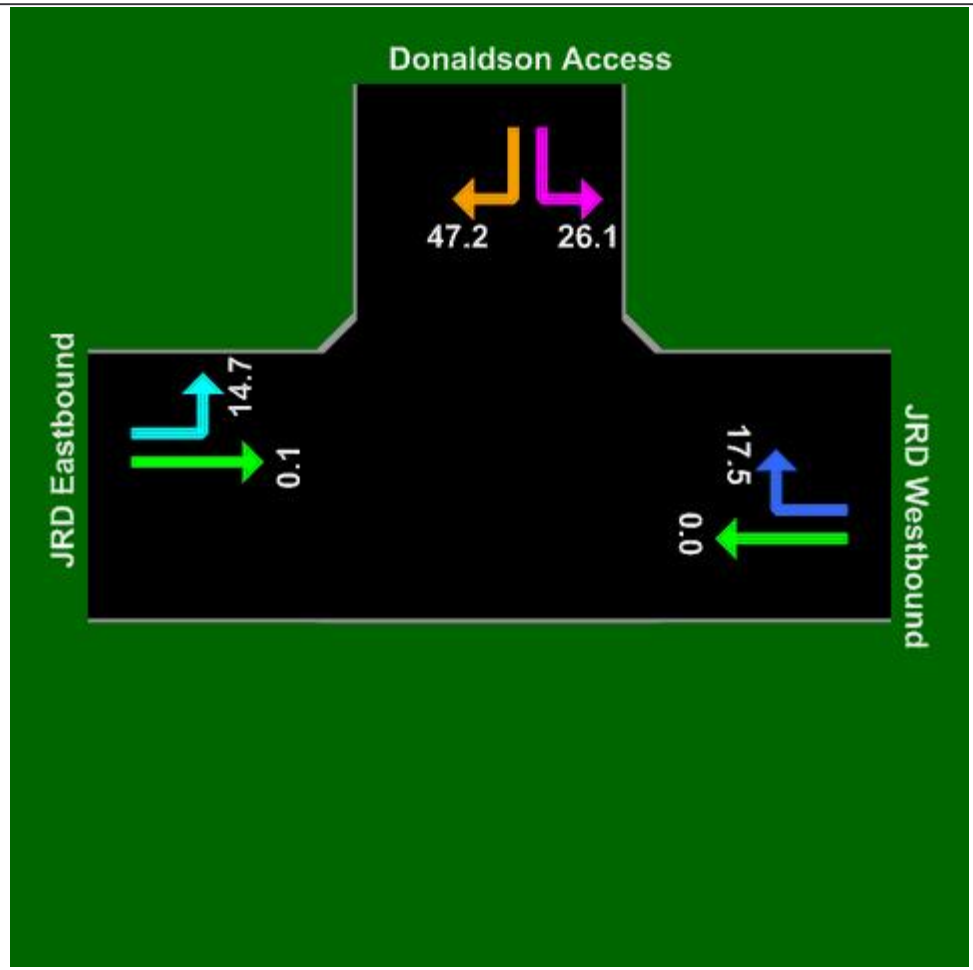
No color code in this display

Control Delay (Average)

akcelik & associates
aaTraffic SIDRA

Average control delay per vehicle (seconds)

Donaldson Access - Scenario 3 (2017) AM Peak



Intersection Type

Two-way stop

Color code based on Level of Service

Continuous movement LOS based on density.

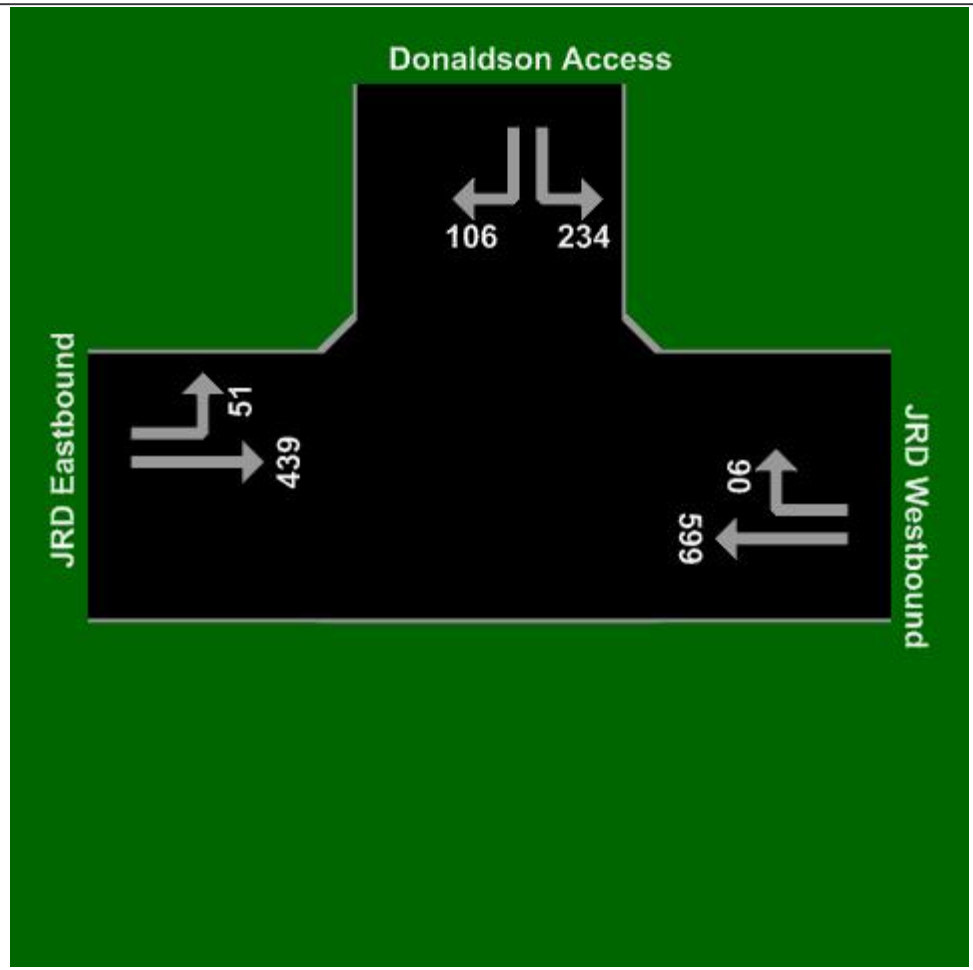
- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

Input Volumes

akcelik & associates
aaTraffic SIDRA

Total flow rates as given by the user (veh/60 min)

Donaldson Access - Scenario 3 (2017) PM Peak



Intersection Type

Two-way stop

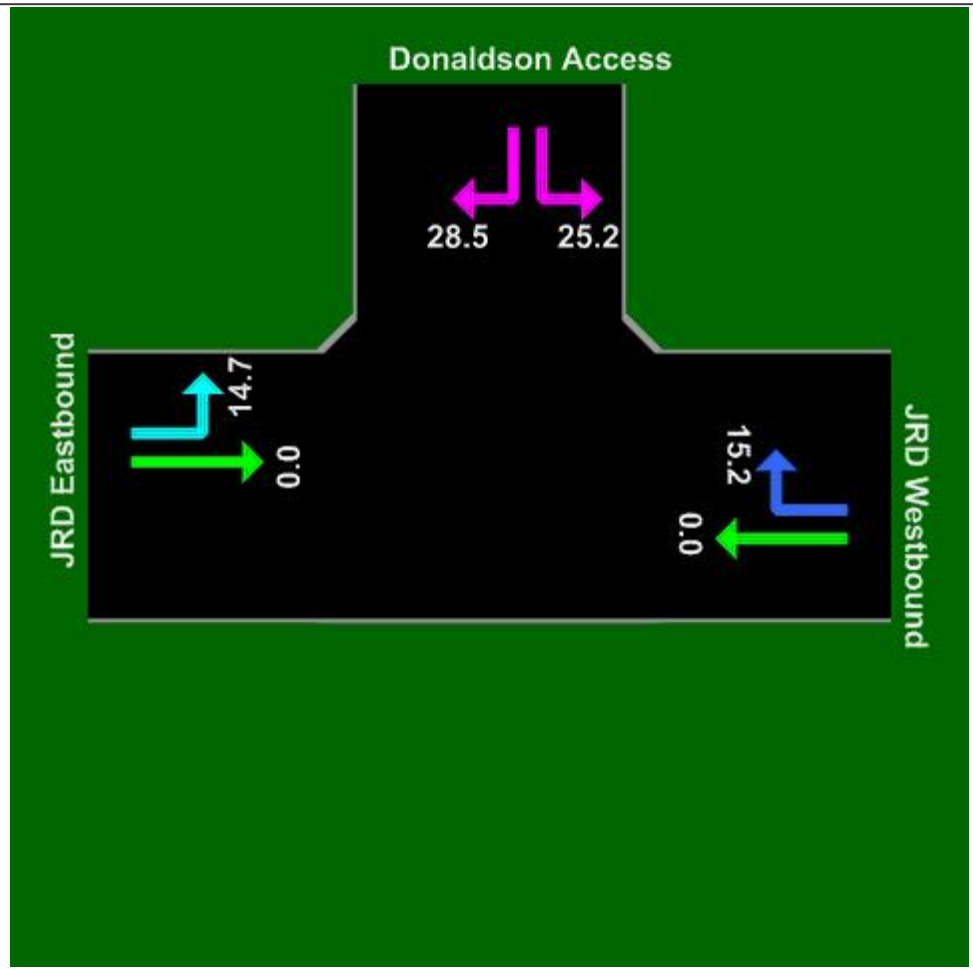
No color code in this display

Control Delay (Average)

akcelik & associates
aaTraffic SIDRA

Average control delay per vehicle (seconds)

Donaldson Access - Scenario 3 (2017) PM Peak



Intersection Type

Two-way stop

Color code based on Level of Service

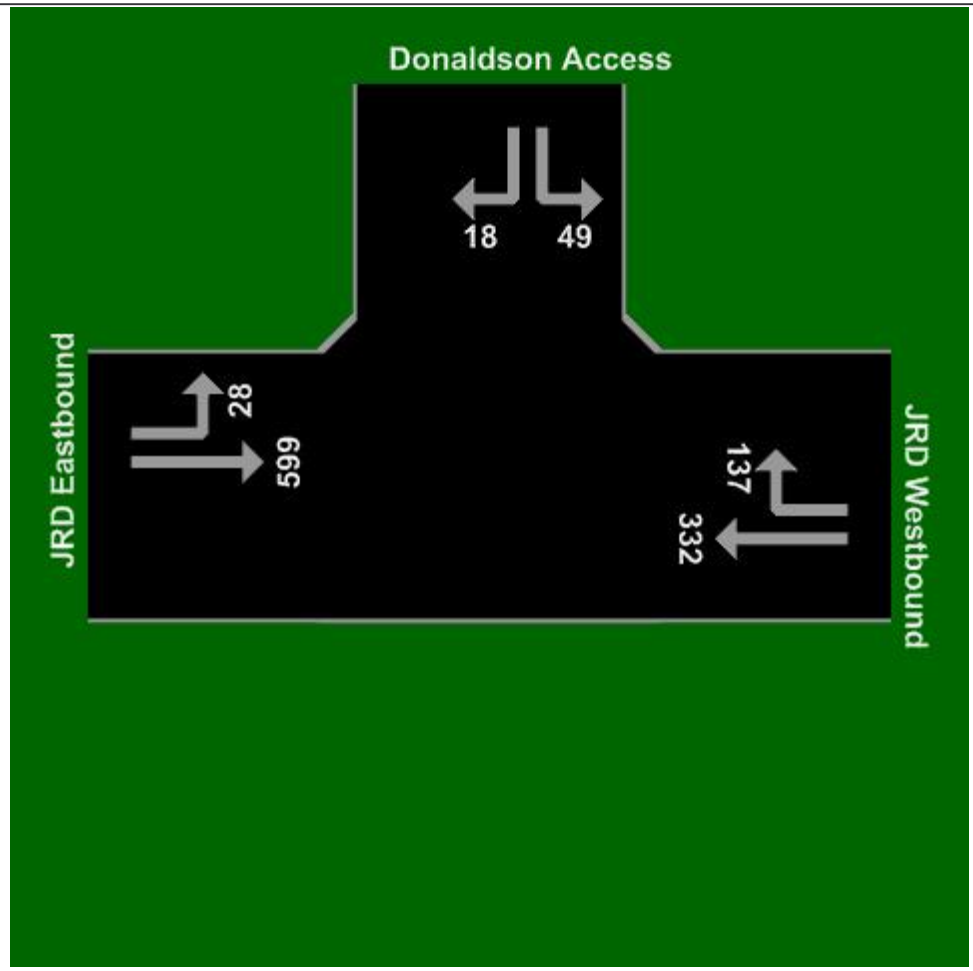
Continuous movement LOS based on density.

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

Input Volumes

Total flow rates as given by the user (veh/60 min)

Donaldson Access - Scenario 4 (2017) AM Peak



Intersection Type

Two-way stop

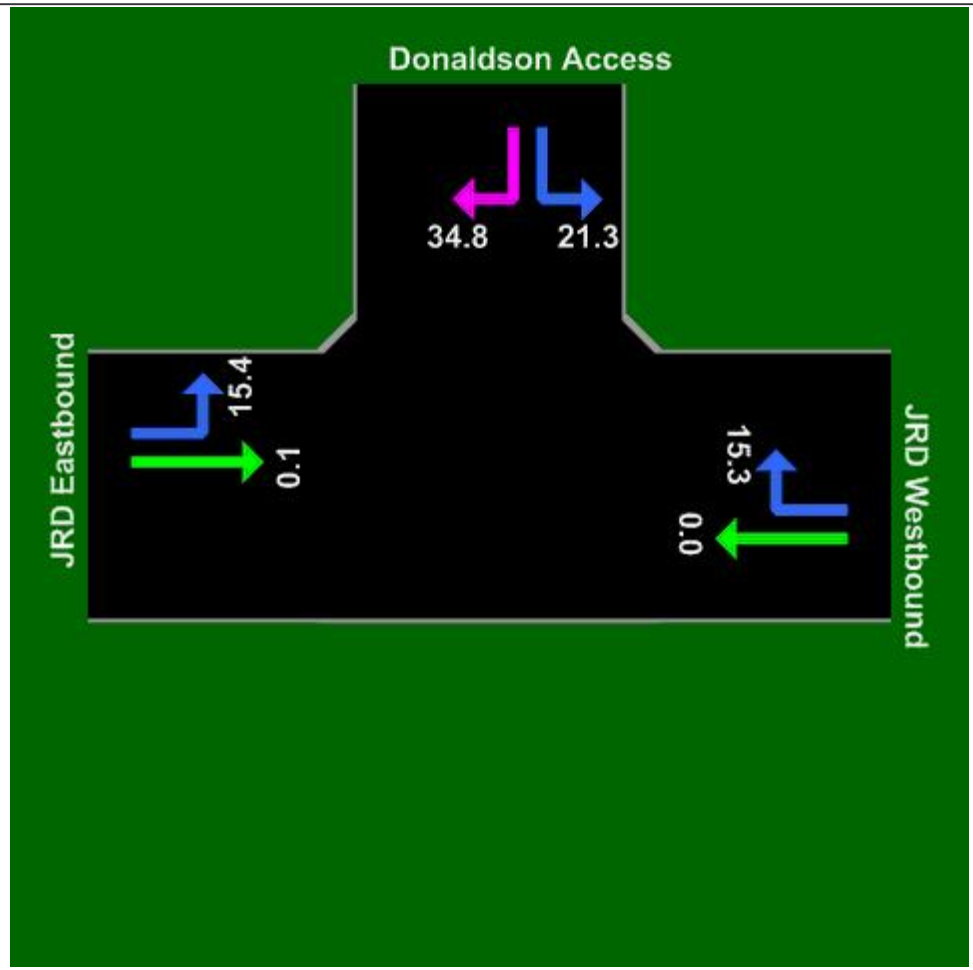
No color code in this display

Control Delay (Average)

akcelik & associates
aaTraffic SIDRA

Average control delay per vehicle (seconds)

Donaldson Access - Scenario 4 (2017) AM Peak



Intersection Type

Two-way stop

Color code based on Level of Service

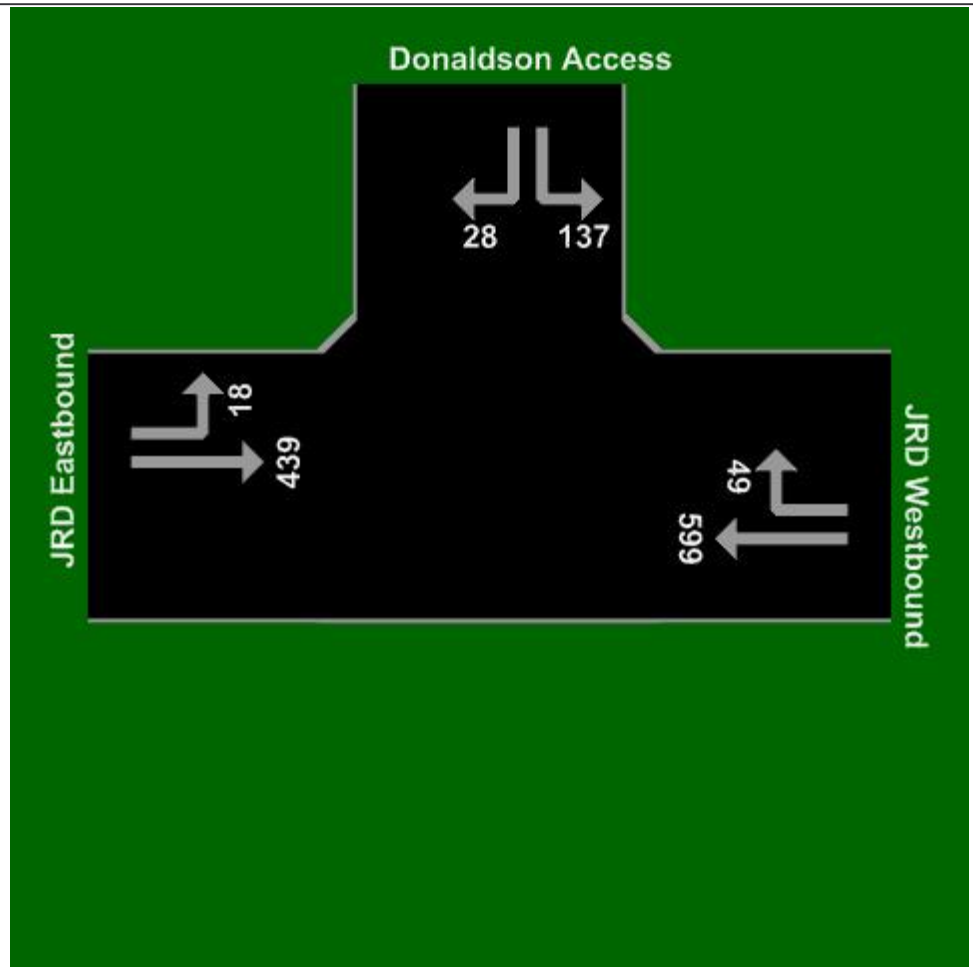
Continuous movement LOS based on density.

- LOS A
- LOS B
- LOS C
- LOS D
- LOS E
- LOS F

Input Volumes

Total flow rates as given by the user (veh/60 min)

Donaldson Access - Scenario 4 (2017) PM Peak



Intersection Type

Two-way stop

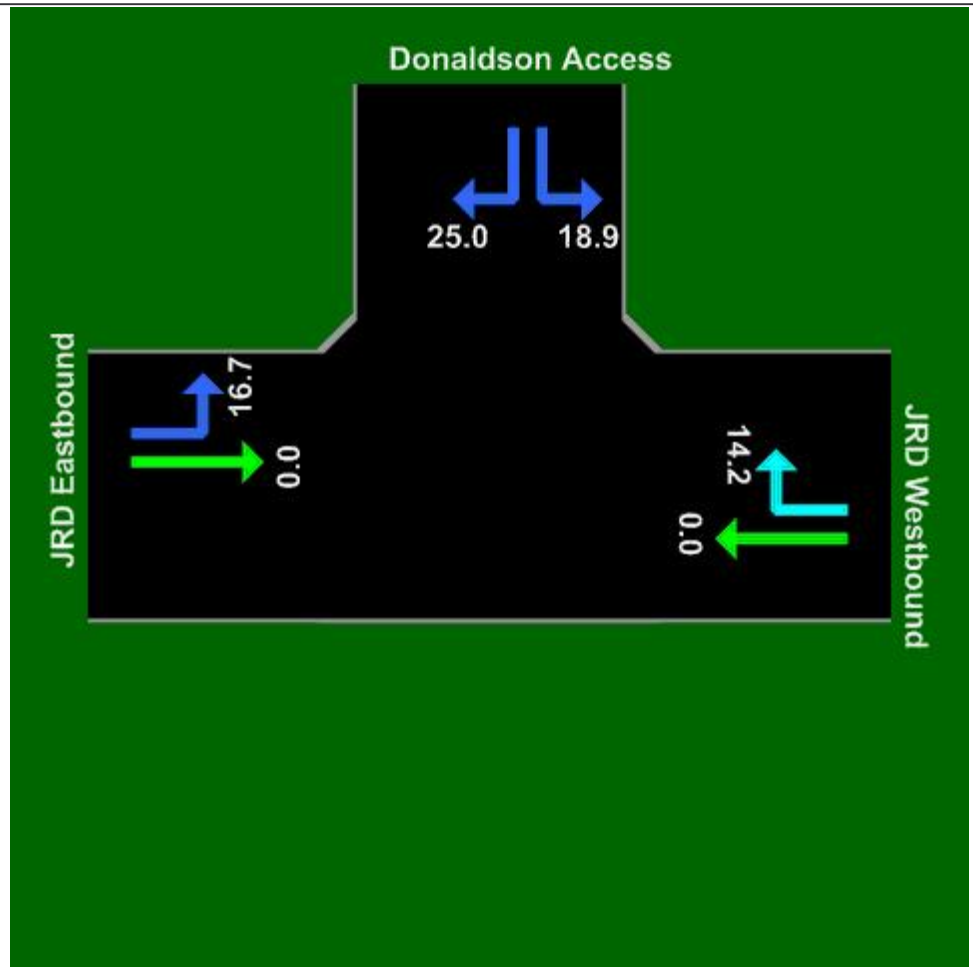
No color code in this display

Control Delay (Average)

akcelik & associates
aaTraffic SIDRA

Average control delay per vehicle (seconds)

Donaldson Access - Scenario 4 (2017) PM Peak



Intersection Type

Two-way stop

Color code based on Level of Service

Continuous movement LOS based on density.

LOS A
LOS B
LOS C
LOS D
LOS E
LOS F