

IN THE MATTER OF of the Resource Management Act 1991

AND

IN THE MATTER OF applications by Central Plains Water Trust to:

Selwyn District Council for resource consents to construct and operate the Central Plains Water Enhancement Scheme

AND

IN THE MATTER OF Notices of requirement by Central Plains Water Limited to:

Selwyn District Council for the designation of land for works associated with the construction and operation of the Central Plains Water Enhancement Scheme

SUPPLEMENTARY REPORT OF NIGEL JOHN WILLIMAS

DATED 8 AUGUST 2008



1. INTRODUCTION

1.1. My name is Nigel Williams. I prepared the Transportation Assessment (dated 31 January) which forms Appendix F of the section 42a report of Council Officer Mr Nick Boyes. My qualifications and experience were set out in that report.

1.2. I have since reviewed:

- the Brief of Evidence of Andrew Whaley issued 1 February 2008
- the Response Of Andrew Whaley To S42a Officer's Report 22 February 2008
- the Brief of Evidence of Walter James Lewthwaite 31/1/08 and
- the Brief of Evidence Of Clifford John Maxwell Tipler 4 July 2008

1.3. I attended the hearing while Mr Whaley presented his evidence and responded to questioning from the Panel of Commissioners on the 13th of March 2008. I have also reviewed the evidence of Walter Lewthwaite (in relation to potential breaches of the canal on the roading system) and of Clifford Tipler in relation to proposed traffic-related conditions.

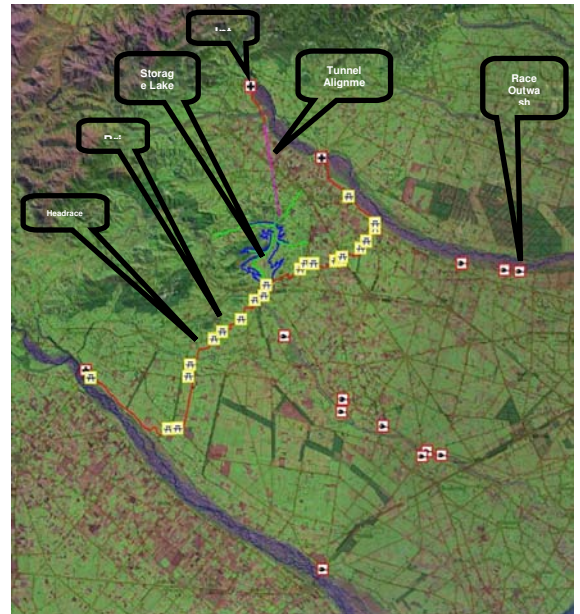
1.4. Generally, I consider that the evidence and response of Andrew Whaley satisfactorily addresses the majority of the concerns raised in my original report. The applicant's final position in relation to Traffic matters is encapsulated in the conditions proposed in Mr Tipler's evidence of 4 July. Therefore, I will confine my comments to a summary of key points of my report and the manner in which these are addressed by the applicant's witnesses, and by the conditions proposed.



2. EXTENT OF THE WORKS

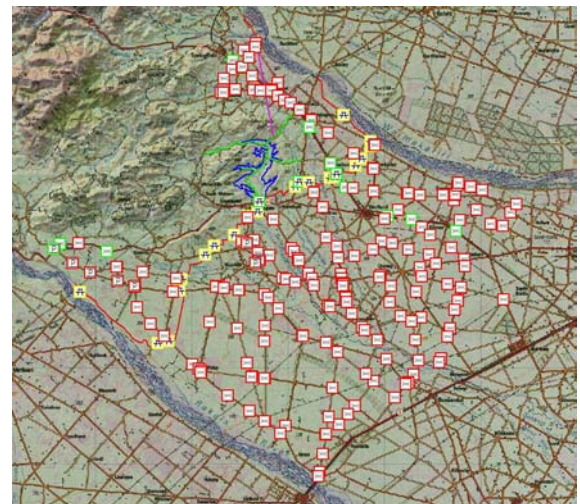
2.1. Extent

- Between Waimakariri and Rakaia Rivers
- From foot-hills to State Highway 1



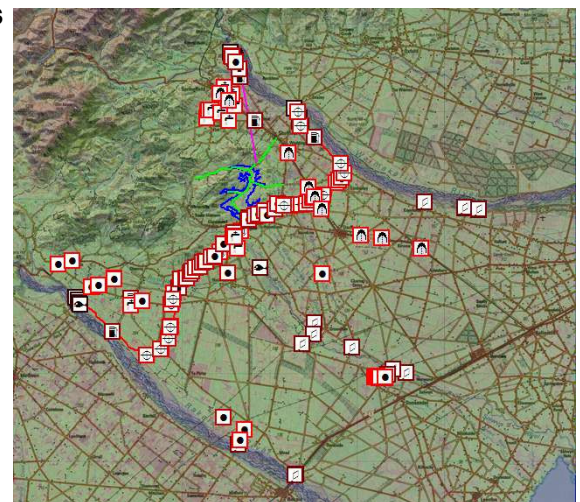
2.2. Specifically-identified On-road Worksites

- Over 230 on-road worksites entailing road crossings.
- Many major bridges
- Numerous culverts
- Most involve traffic diversions or temporary closure of roads



2.3. Specifically-identified Off-Road worksites

- Over 150 off-road worksites
 - Intake structures
 - Pumping stations
 - Stream, river and race crossings
 - Stock water race crossings
 - By-wash sites



3. POTENTIAL TRAFFIC EFFECTS

3.1. Operation of the Scheme

Permanent road stoppings and traffic diversions.

3.1.1. Comment: All temporary or permanent road stoppings and closures will require separate notification and processes to be concluded in a way that will allow the scheme to proceed. There is no formal obstacle to the initiation of these procedures.

Day-to-day activities will include

- Scheme supervision and inspection

- Minor on-going extension or alterations of race systems

3.1.2. Comment: Any traffic-related issues arising during such activities will be addressed by the operator's health and safety and traffic management plans.

Periodic clean-out of races and reservoirs

3.1.3. Comment: A condition is proposed to ensure race cleanings are not disposed of in a way that could adversely affect road transport.

Potential leakage from water bodies impacting on road structures

3.1.4. Comment: The matter of potential damage to roads due to this cause is addressed by the proposed conditions.



Potential failure of the headrace and consequent danger to the District and Regional road network due to water loss from the race.

3.1.5. Comment: In my report I proposed two stop-gap conditions that would offer a measure of reassurance in this regard. These were:-

CONDITION T12. (Permanent Works). A minimum of three intermediate control gates each capable of remote controlled un-manned operation shall be located within the header race to minimise the impact of any failure of the header race upon road infrastructure or traffic operations.

CONDITION T13 (Permanent Works). The minimum diameter of culverts passing beneath the header race shall be 1.5m.

3.1.6. Both these conditions were suggested as a means of protecting the integrity of the road network from the possible effects of culvert blockage or breach of the head race.

3.1.7. In response to these suggested conditions Mr Whaley directs me to Mr Lewthwaite's evidence dated 31/1/08. Mr Lewthwaite notes (my emphasis):

255. Discharges from headrace. The scheme has no plans for discharge points from the main headrace canal other than normal operational discharges through the fish bypass, sediment sluicing, and to the distribution network. **The most likely emergencies would derive from power cuts or sudden floods when river intake gates, or the storage lake outlet is open, or if a stream underpass blocked during heavy rain. Enough gates will be provided to have a robust system of controls throughout the scheme to manage unexpected events,** and the scheme races have enough capacity, including outlet capacity, to transport some 45 m³/s. At each upstream end of the headrace there will be gates at the river intake and below the sediment settling pond. At the Waianiwaniwa reservoir outlet there will be a flow control structure, and there will also be about ten gates controlling outflows into the distribution system. **These controls are sufficient to provide the capacity to handle any reasonably foreseeable event.** Further, to guard against effects of power cuts the scheme will provide emergency backup generators at larger key structures and backup manual controls at smaller structures. **Regarding blocked culverts and other crossings it is anticipated that proper design and maintenance will be required to minimise the incidence of damage."**

Walter_James_Lewthwaite CHCH_DOCS\443640\1



3.1.8. This suggests to me that if unchecked, a full-depth breach of the headrace canal has the potential to see the canal discharging at 45cumec from each side of the breach to empty completely in about 16 hours (assuming the river and reservoir entry gates are closed), putting about 5 million cubic metres of water through any breach and flowing down-slope across the district road network in the vicinity. The applicant has expressed the intention of having a ‘...robust system of controls throughout the scheme to manage unexpected events...’ and ‘...proper design and maintenance will be required to minimise the incidence of damage.’ [Lewthwaite], however until the Council has direct evidence of such controls and designs I am reluctant to remove these precautionary conditions (or more importantly to remove the expectations implicit in these conditions) entirely.

3.1.9. The core question here is *“If the Council gets a phone call in the middle of the night that there is water from a breach in the canal flowing across a road, what practical physical systems are in place to control and minimise the volume of water involved and to minimise damage to roading assets and private property – putting it simply – how do we turn the tap off?”*

3.1.10. Thus I would propose that some condition should be retained until such time as a detailed design is to hand which provides the necessary sufficient technical reassurance on this matter.

REVISED CONDITION T12. (Permanent Works). Unless explicitly otherwise permitted by road controlling authorities, a minimum of three intermediate control gates each capable of remote controlled un-manned operation shall be located within the header race to minimise the impact of any failure of the header race upon road infrastructure or traffic operations.

REVISED CONDITION T13 (Permanent Works). Unless explicitly otherwise permitted by road controlling authorities, the minimum diameter of culverts passing beneath the header race shall be 1.5m.



3.1.11. Note that the phrase: “Unless explicitly otherwise permitted by..” is taken from the conditions proposed by Mr Tipler for the applicant.

3.1.12. In common with several other conditions I have proposed, I expect that as the design advances the applicant will seek variations to some conditions where a clearer view of the works involved permits the use of alternative methods that will achieve the required outcomes. These variations should be developed in conjunction with the relevant road controlling authorities - New Zealand Transport Agency (formerly Transit New Zealand) and the Selwyn District Council - and so consent to such variations should not be unreasonably withheld.

Overall Comment on the Day-to-Day Operation of the Scheme:

3.1.13. Overall the direct traffic effects of the scheme’s operation will be low key and able to be accommodated by existing transport infrastructure.

3.2. Flow-on Effects

- Anticipated increase in the intensity of farming due to the improved availability of water for irrigation.
- Increased economic and traffic activity in rural service towns.
- Increases in traffic volumes arising from farm service and staff travel.

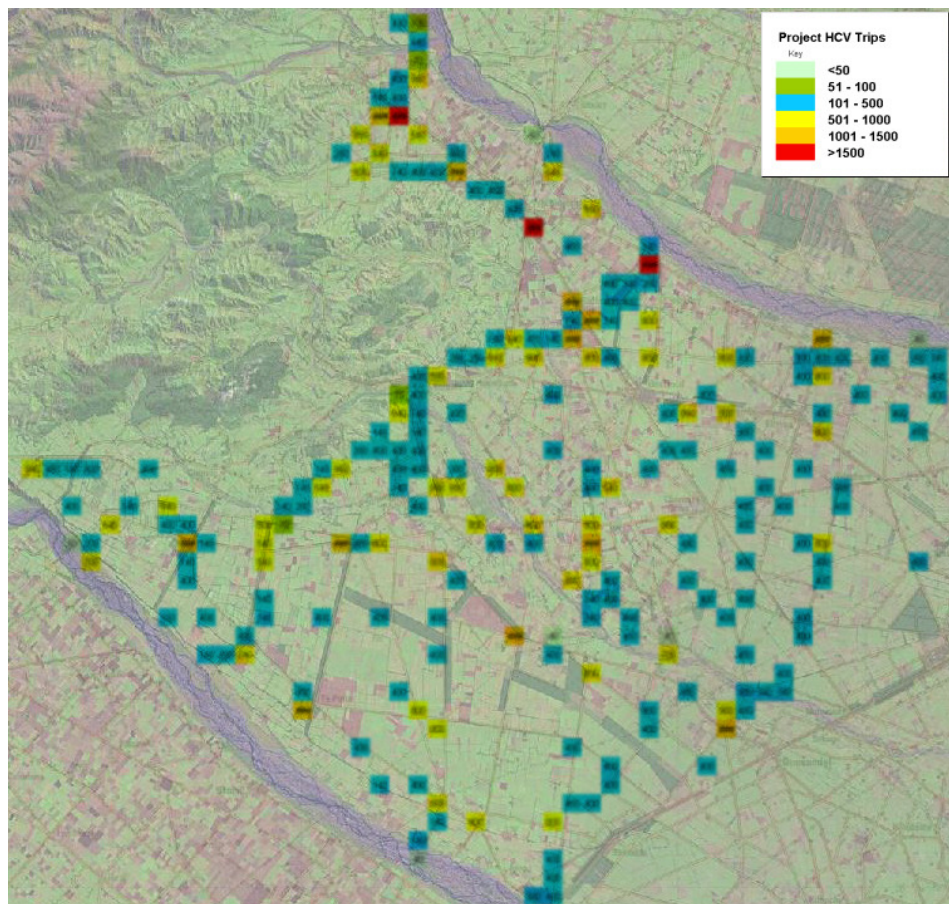
3.2.1. Comment: Recent information on the potential shortfall of fuel supply versus the anticipated global demand suggests that any background increase in traffic volumes arising from uptake of the water scheme will be more than compensated for by the expected reduction in fossil-fuelled vehicle activity on the district’s roads. (See Appendix 1, below).



3.2.2. Comment: Any flow-on effects will be able to be addressed by the Council's overall roading maintenance efforts over time. The funding for this work will be supported by the increased rateable value of the properties benefiting from the scheme.

3.3. Construction Effects

3.3.1. Traffic Activity Outside the Dam & Valley Worksites



- Over 1100 worksites.
- 325,000 trips generated over 1000 day construction period.

3.3.2. Traffic Activity at Dam and Valley Worksites

- 350,000 Over-weight haul trips to build the dam.



- 30,000 conventional truck trips for aggregate, concrete, road construction etc.
- Traffic activity focussed on the intersection of the construction site with Homebush Road / SH 77 by Coalgate.

3.3.3. Potential Traffic-related effects include:

- Disruption of access to property and recreation areas.
- On-road conflicts and safety issues between construction and other traffic.
- Delays and diversions around worksites.
- Noise, dust and vibration of heavy traffic.
- Temporary impacts on operation of farms and businesses near roads used by construction traffic.
- Impact on Coalgate Township.
- Damage to roads due to construction traffic.

Comments on Construction Effects

3.3.4. The applicant is proposing to address construction-related effects by the implementation of traffic management plans. The critical elements of the content of these traffic management plans are addressed by the proposed conditions.

3.3.5. The anticipated worsening fuel supply situation could impact on the progress of the works due to the project's reliance on fossil-fuels for all



transport and most energy needs. (See Appendix 1, below). Depending on the fuel supply regulation scheme the region will adopt this could reduce the daily traffic volumes associated with the scheme which could in turn see the duration of road works extended proportionally. Alternatively if fuel allocation is based on a balance of National or Regional Good then the project may either win or lose its fuel allocation entirely – depending on the outcome of such broader assessments.

3.3.6. My estimate of the overall trip generation suggests that on average over the construction period the project will generate between 350 and 650 trips per day from worksites remote from the dam and valley area, and a further 350 to 400 trips per day involved with the dam and valley works. Due to the spread of the worksites over the project area and the proposed grade separate junction for the access to the dam and valley worksite the impacts of this traffic activity (subject to the controls of the proposed traffic management plans proposed in the conditions) will be tolerable.

4. Proposed Conditions

4.1. Mr Tipler (4 July 2008 – Appendix C – Revision A) proposes traffic-related conditions in relation to the Resource Consent Application (his pages 74 to 78) and the Designation (his pages 94 to 96).

4.2. Apart from the two conditions discussed above (T12 and T13) Mr Tipler adopts the conditions I have proposed. He has made some minor changes to the wording of some, and I am satisfied that these changes are helpful and should be accepted.

4.3. I note that the conditions he identifies on Page 74 and 75 numbered 2.2 j, l, m, o, p, q, r, s and t are general conditions relating to the scheme and not exclusively to construction traffic. Thus these should be re-numbered and re-positioned to ensure that they are imposed



generally, and that they apply equally to the notice of requirement (designation) and resource consent applications.

5. Conclusion

5.1. The traffic-related effects of the project are likely to be affected by the increasing divergence between global fuel supply and demand. This effect will become increasingly pronounced over the next 5 years, and potentially will become acute for the scheme (and the nation generally) in the next ten years. Viewed in isolation from a road and traffic perspective this likely reduction in traffic activity may usefully ease any expected adverse traffic impacts.

5.2. Subject to “business as usual” in regard to fuel supplies, with the imposition of the conditions as discussed above I believe that traffic conditions during construction will be manageable.

5.3. Post construction any traffic effects arising from the increased intensity of farm operations implicit in the scheme are expected to lie within the scope of current trends in traffic growth on the District’s and Region’s roading system, and so no special provision is needed to cater for such growth.

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Appendix 1 – Oil Production and Demand Data

1. Historically predictions of future traffic volumes have anticipated that background traffic volumes will continue to grow over the planning period at unrestrained rates of between 1% and 4% per year. However the present supply and demand conditions of the global oil market are impacting on the cost of travel, and thus on overall traffic volumes.
2. A review of the global fuel production and demand trends is contained in the charts below. The 1973 'Oil shock' saw OPEC cut fuel production. This resulted in a 25% to 30% reduction in fuel supplied from OPEC, which translated into about a 5% reduction in global oil supply over the period of the 'crisis'. (See Figure O-1, below) This analysis examines the predicted production vs demand curves to see when a 5% shortfall in supply over demand is likely to occur in the future. The analysis finds that with steadily growing global demand and the flattening and reduction in production, the demand for fuel is likely to exceed production by 5% or more sometime between the year 2009 (using the mean of a number of model predictions) and 2012 for the more optimistic scenarios (see Figure O-2, below).
3. Commenting on a recent review of global fuel supplies the Executive Director of the International Energy Association noted that: *"The market would initially relax from now until 2009/2010, due to a foreseeable increase in supply brought about by new production sites. After 2010 however, supply would drop and demand increase, particularly in developing countries."*¹
4. Thus it is very likely that by 2012 at the latest New Zealand will be experiencing an 'oil shock' that will be passing the level experienced during the early 1970s and it is unlikely that there will ever be any sustained recovery to previous levels of satisfaction of demand. Thus traffic volumes generally can be expected to decline as both the increased cost and reduced availability of transport fuel sees fuel allocations focussed foremost on the maintenance of strategic freight services for conveying essential commodities and for key emergency and public health services. Private motor car use will be heavily impacted from the outset, and we are already seeing signs of this in reduced traffic volumes on some national arterial routes such as Auckland's motorways.
5. Under these conditions less fuel-intensive modes will regain favour. Coastal shipping and local rail services will become essential parts of the freight mix, while road freight transport powered by imported oil will be reserved for critical journeys that cannot be otherwise accomplished. Likewise air transport will become focussed on the movement of the highest value commodities both for sustaining international trade and for timely delivery of essential supplies to maintain local economic and social activity and wellbeing. Inevitably some form of energy rationing will be imposed.
6. The 1973 oil embargo by OPEC saw global production drop by about 5% in conjunction with a marked rise in the price of OPEC oil.

¹ **IEA Executive Director Nobuo Tanaka** Interview with German business paper Handelsblatt. 07 July 2008



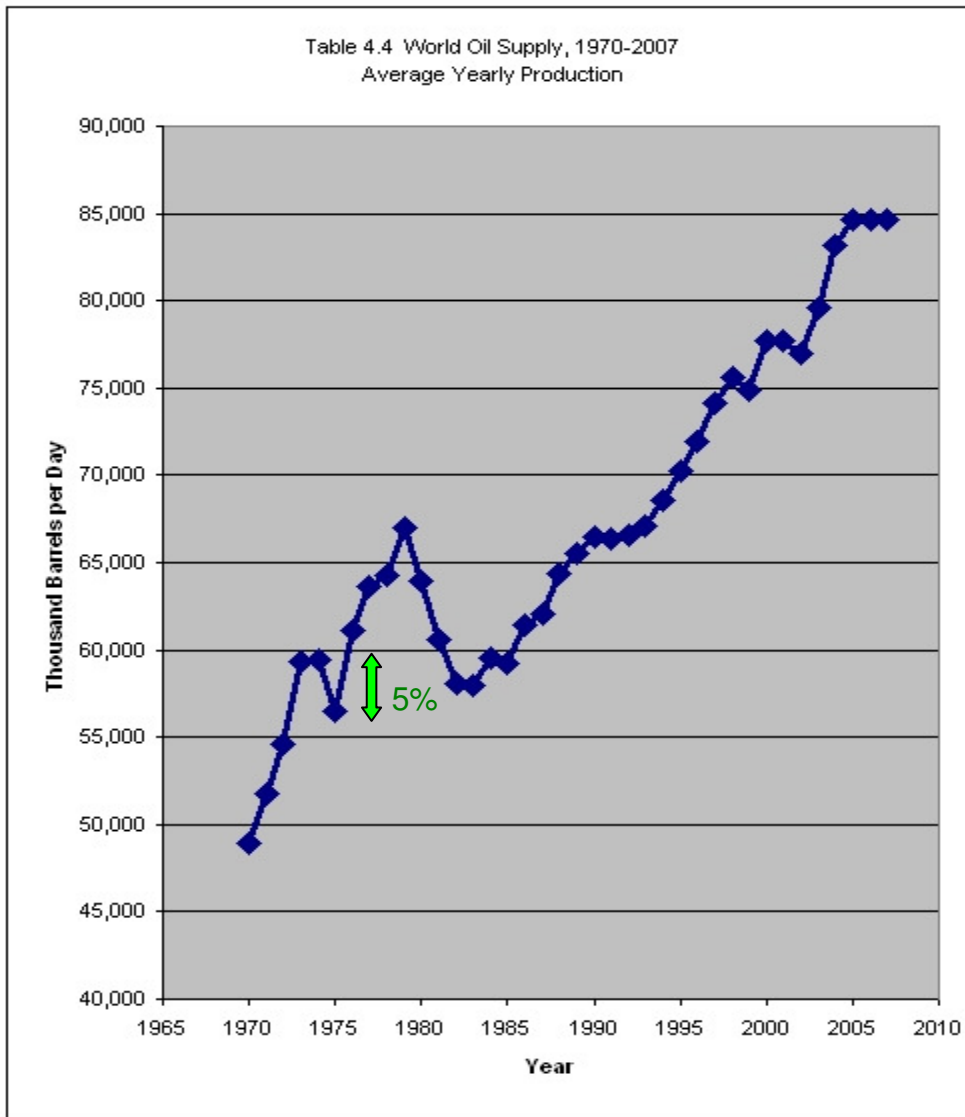


Figure O-1 Impact of 1973 Oil Supply Reduction on Global Production

Chart Source: Data from Energy Information Administration
 April 2008 International Petroleum Monthly
 Posted: May 12, 2008 Next Update: Early June 2008
<http://www.eia.doe.gov/emeu/ipsr/supply.html>



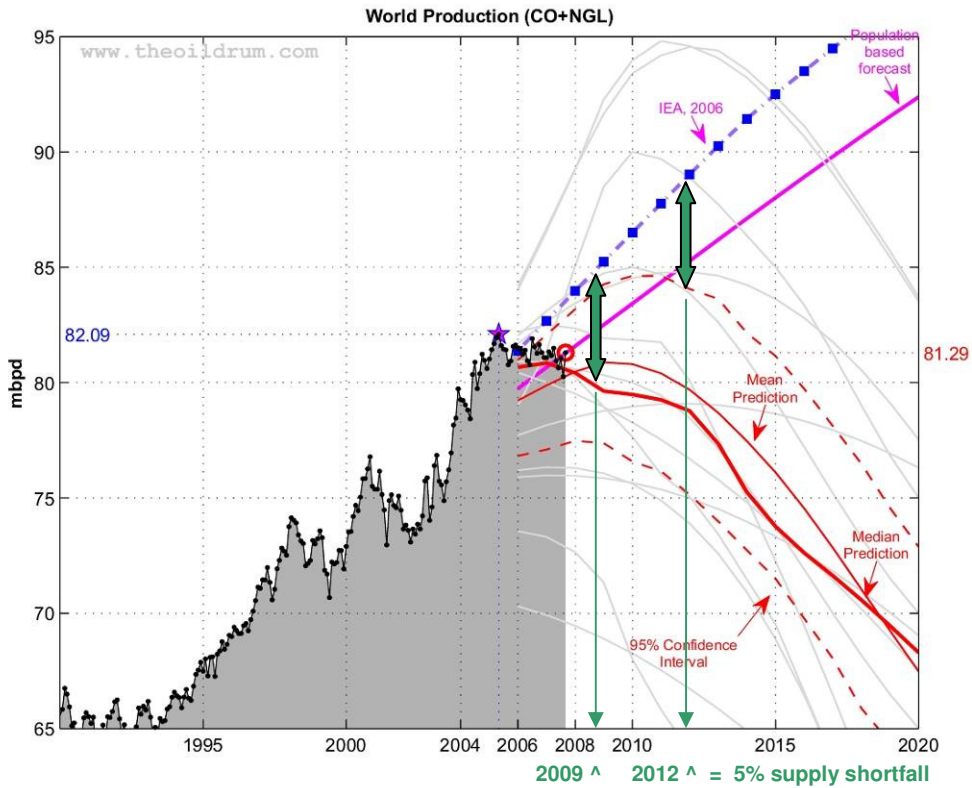


Figure O-2 Estimated year of arrival of 5% supply shortfall compared with demand.

The rising dotted line is the expected demand, while the falling curves are model forecasts. The vertical green arrows represent 5% of current production, and thus indicate the points where expected demand and supply are at least 5% apart.

Based on chart published in The Oil Drum December 29 2007
Peak Oil Update - December 2007: Production Forecasts and EIA Oil Production Numbers

Using: World oil production (EIA Monthly) for crude oil + NGL. The median forecast is calculated from 13 models that are predicting a peak before 2020 (Bakhtiari, Smith, Staniford, Loglets, Shock model, GBM, ASPO-[70,58,45], Robelius Low/High, HSM). 95% of the predictions see a production peak between 2008 and 2010 at 77.5 - 85.0 mbpd (The 95% confidence interval is computed using a bootstrap technique).

- CO= Crude Oil + lease condensate
 - NGL= Natural Gas Liquids (lease condensate + NGPL)
- <http://www.theoildrum.com/node/3439#more>

