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MANATŪ KAUPAPA WAONGA
NEW ZEALAND MINISTRY OF DEFENCE

9 October 2026

RESPONSE TO YOUR OFFICIAL INFORMATION ACT REQUEST

On 14 September the New Zealand Defence Force (NZDF) transferred to the Ministry of Defence part of your information request of 11 September . You requested, pursuant to the Official Information Act 1982 (the Act) the following information:

1 *December 1998 MoD Policy and Planning capability analysis study of the capability requirements for an infantry mobility vehicle*

2 *Report of the MoD and NZ Army December 1998 visit to determine if the ASLAV would be suitable for NZ*

3 *HVR Consulting Services validation of armored vehicle specifications 1999*

4 *June 2000 Sec Def briefing to the Minister including discussion around the LAV III*

5 *NZ Army FDP (or equivalent) for the LAV III*

6 *Any other relevant documents not previously released under the OIA relating to the LAV III purchase*

As you will be aware, the files that you requested are historic, and it has now been some time since the Ministry purchased the Light Armoured Vehicles for the New Zealand Army. The Ministry sought to identify key information held in archives. Specifically Ministry staff searched files held in offsite Ministry archives that span the procurement process of the project, over the relevant time period. Hardcopy files were searched relating to contracts for the LAV procurement, correspondence documents, pre-tender material, and Ministerial documents for the relevant time period.

We have numbered the elements of your request for ease of response. We have been able to locate documents relating to items 1, 3, 4 and 5 and these are enclosed.

Item 1: *December 1998 MoD Policy and Planning capability analysis study of the capability requirements for an infantry mobility vehicle*

The Ministry's search has not located a December 1998 document, but identified the enclosed Cabinet paper *Motorisation of the NZ Army* which was signed in April 1999. This paper sets out the analysis of the capability requirements for this project, and was the basis for as you have requested.

Item 2: ***Report of the MoD and NZ Army December 1998 visit to determine if the ASLAV would be suitable for NZ***

The Ministry was unable to locate a document relating to this part of your request, as such this part of your request is declined under section 18(e) – that the document alleged to contain the information requested does not exist or, despite reasonable efforts to locate it, cannot be found.

Item 3: ***HVR Consulting Services validation of armored vehicle specifications 1999***

The document titled *New Zealand Ministry of Defence Armoured Vehicle Project IV&V Report* is enclosed.

Item 4: ***June 2000 Sec Def briefing to the Minister including discussion around the LAV III***

The Ministry did not identify a June 2000 document, however the search identified an August 2000 document that we believe holds the information sought. This document is titled *Purchase of Light Armoured Vehicles* and is enclosed.

Item 5: ***NZ Army FDP (or equivalent) for the LAV III***

Regarding this part of your request, we have identified a document titled *Purchase of New Zealand Army Light Armoured Vehicle* which includes the Force Development Proposal, and is enclosed.

Item 6: ***Any other relevant documents not previously released under the OIA relating to the LAV III purchase***

Your request for any other relevant documents not previously released under the OIA would require substantive research, consultation and assessment of large volumes of information, and so is declined under section 18(f) of the Act. Given the age and volume of the material that is held in hardcopy, the Ministry is not in a position to readily identify which LAV III records have or have not been released publicly. I also note that the LAV III is a current combat capability used by both the New Zealand Defence Force and partners, and that certain commercial details relate to companies that continue to be part of Defence industry. As such national security and commercial sensitivities may apply to information held in relation to the LAV – even given the passage of time.

Under section 28(3) of the Act you have the right to request the Ombudsman to investigate and review this response.

Yours sincerely

Sarah Minson

Deputy Secretary Capability Delivery

Enclosed:

- *Motorisation of the NZ Army*, 1999
- *New Zealand Ministry of Defence Armoured Vehicle Project IV&V Report*
- *Purchase of Light Armoured Vehicles* August, 2000
- *Purchase of New Zealand Army Light Armoured Vehicle*, 28 May 1999

Office of the Minister of Defence

Chair
Cabinet Strategy Committee

MOTORISATION OF THE NZ ARMY

SUMMARY

1. This proposal seeks Cabinet approval to change the concept of operations of the New Zealand Army to a motorised infantry force, and consequently seeks a change in scope to CAB (98) M 10/5B(4) the approval-in-principle previously granted for the acquisition of armoured vehicles.

2. Approval of the motorisation proposal will allow the Army to restructure its fighting elements so that they are optimised for the concept of manoeuvre warfare. The change of scope will enable the Ministry of Defence to seek firm offers for the supply of wheeled armoured vehicles necessary to support the first phase of the transition to this revised concept of operations. It is likely to be approximately 9 months before a further submission seeking approval-to-commit will be brought back to Cabinet. Delivery of the vehicles and introduction to service with the Army could be another 12-18 months.

BACKGROUND

3. CAB (98) M 10/5B(4) of 23 March 1998 approved-in-principle the acquisition of armoured vehicles for the New Zealand Army. It was proposed that the current M113A1 Armoured Personnel Carrier (APC) would be replaced with an upgraded M113 or a new vehicle, and that a new Fire Support Vehicle (FSV) be procured to support the APC in operations. The proposal was based on 69 APCs and 12 FSVs, at an estimated cost of NZ$160 million, excluding GST, and was designed to give protected mobility to a single company within the deployable Battalion Group. That is, about one quarter of the infantry force.

4. The reduction in the value of the New Zealand dollar during 1998 severely affected the ability of the 1997 White Paper funding envelope to support the associated capital investment plan. A revised capital investment plan was presented to the Government in November 1998. CAB (98) M 45/25 records the Government's reaffirmation of its overall defence policy, and noted that the current programme of re-equipping the Army meet this priority with a $500 million army defence capital purchase plan. Within this plan the replacement armoured vehicles were made a Priority One project, and the estimated cost revised to NZ$212 million, excluding GST.

5. In parallel the NZDF was investigating operational concepts and organisational structures within the Army that would better achieve, and support for the longer term, the range of demands placed on it by the White Paper. Studies led to

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conclusion that a motorised infantry force employing the doctrine of manoeuvre warfare would have the greatest utility in achieving policy goals. A review of recent technological developments together with discussions with our immediate allies on their concept of operations led to the conclusion that the characteristics of wheeled armoured vehicles would better suit New Zealand's requirements than tracked vehicles. Motorisation will give the infantry the protection and mobility associated with modern wheeled armoured vehicles, and will better equip the Army to generate the range of capabilities required of it by the 1997 White Paper.

COMMENT

6. The 1997 White Paper, the Shape of New Zealand Defence, (SONZD '97) defines the required generic military capability for the Army as follows:

> *"General purpose land forces are required to deal with low level contingencies, such as protecting vital installations and, in the event of a more serious threat, to operate as part of a combined effort in the conduct of conventional land combat operations. They must be able to deal with the full range of peace support roles, including peace enforcement."*
> *(SONZD 97, page 46)*

7. Of particular relevance to this submission is the requirement for Army to be able to deploy and sustain up to a battalion group to participate in conventional mid level operations as part of a regional or coalition force, or to undertake Peacekeeping, Peace Support or Peace Enforcement operations. This battalion group is currently held at 60 days notice, in accordance with the NZDF Purchase Agreement.

Current State of Motorisation Within The Army

8. At present, the Army possesses sufficient vehicles to conduct the liaison, command and control tasks; move its heavy and towed equipments around the battlefield, and be able to logistically sustain and resupply itself. The vehicle fleet used to complete these tasks consists primarily of Land Rovers, 4 tonne and 8 tonne trucks, and a range of trailers.

9. The infantry's main method of movement is by foot. Where it is necessary to move them by vehicle, trucks are used in areas where they may not be subject to directed enemy fire. However, in doing this, these trucks are not available for their primary logistics and sustainment tasks. The infantry can also be moved by utility helicopter, but only in small groups, and again only in areas where there is little risk of directed enemy fire.

10. Where infantry are required to be moved in areas exposing them to high risk of enemy directed fire, there are only sufficient Armoured Personnel Carriers (APCs) to move one company group at a time (one quarter of one battalion). As will be noted later in this paper, the existing vehicles also have significant limitations.

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Historical Employment And Lessons

11. The New Zealand Army has deployed a wide range of its operational capabilities (by size and type) during this decade. Throughout these deployments, New Zealand forces have faced a wide range of protagonists over a wide variety of terrain. The opposing forces have ranged from gangs in Somalia, through the conventionally armed provisional or militia forces encountered in Bosnia and Angola, to powerful conventional forces encountered in inter state warfare, such as in the Gulf. Given our assessment of future employment circumstances, this variety of terrain and opponent type is unlikely to change. There is a clear and consistent trend towards the antagonists being armed with increasingly longer ranged and more lethal weapons, and vehicles with improving levels of protection and mobility.

12. Our traditional defence partners have recognised these developments as significant and primary force shapers. As a consequence, they are either organised around (UK, USA, Canada), or are moving to (Australia), infantry battalions equipped with their own organic protected mobility.

13. With this motorisation of the infantry, the sizes of operational areas being assigned to infantry battalions are now much bigger. This increase in size is possible because of the characteristics of this type of force. The full impact of this increase in the size of operational areas was bought home to the NZ Army in Bosnia. Kiwi Company, a force one third the size of a battalion, was assigned an area 12.5 times larger than that a complete battalion would reasonably be given, based upon traditional foot mobility. Therefore, the effective increase in the size of operational areas, when compared at battalion level, is a factor of 36 times.[1]

Deficiencies Identified in Army's Capabilities

14. The deficiencies in the NZ Army's capabilities were confirmed by the Kiwi Company deployment to Bosnia. This deployment showed that the NZ Army, with its current equipment types and method of operation, would be incapable of operating effectively in anything other than a benign environment, without imposing significant risk on the wider force within which it would work. This has implications for the value that our traditional defence partners place on New Zealand's peacekeeping efforts. Bosnia highlighted that the Army lacks the means to be able to move and manoeuvre its forces with the necessary degree of protection and speed to ensure the survivability of the force whilst it completes its assigned tasks in a timely manner. A funding provision of NZ$212 million, excluding GST, has been made in the DCP for the procurement of armoured fighting vehicles including Fire Support Vehicles (FSVs).

15. The NZ Army, with its present range of capabilities, continues to have utility for Government, albeit with some limitations in employment. However, unless these deficiencies are corrected, the force's utility will diminish with time.

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[1] *This analysis is based on a comparison of operational areas assigned to Kiwi Company in Bosnia (motorised, operating in an area 50 x 100 km) and that assigned to FIJIBAT in UNIFIL (not motorised, operating in an area 20 x 20 km).*

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16. In particular, our forces would lack comparable operational effectiveness, and therefore lack credibility with both our allies and opponents. These two factors will reduce the value our defence partners may place on any contribution we might wish to make in the future. Similarly, they reduce the Government's options to signal support for peacekeeping operations and its willingness to bear an appropriate portion of the operational risk. This would affect NZ's ability to achieve its policy goals within a coalition force.

17. Finally, the level of risk to Army's personnel would increase significantly. This could increase the risk of loss of public support for NZ's commitment, together with public censure of Government, if significant numbers of casualties were sustained.

Motorisation Versus Mechanisation

18. In seeking to increase the mobility and protection for the manoeuvre elements of the Army, a basic choice must be made: base the Army around a motorised manoeuvre organisation, or around a mechanised manoeuvre organisation.

a. **Motorisation.** This concept involves the use of armoured vehicles to transport the manoeuvre elements to an area where the soldiers dismount and complete their tasks on foot. The armoured vehicles then withdraw. During movement to the area, and whilst the soldiers are dismounted, the force is supported by FSVs. A force designed around this type of capability would be unable to operate effectively in operations such as a deliberate assault on prepared positions. Such a force could however, be used effectively in flank security operations. A motorised force would also be suitable for most low intensity conflicts and peace support and enforcement operations.

b. **Mechanisation.** This concept involves the use of armoured vehicles to transport the manoeuvre elements to an area, and then onto or through a defended objective before the soldiers dismount. The vehicle is an integral part of the way the manoeuvre elements fight. This is possible because the vehicle has its own large calibre gun that provides intimate support to the particular manoeuvre element. Like motorised units, mechanised forces are supported by FSVs. However, there are more of them, and traditionally, these are main battle tanks. Such a capability would enable the manoeuvre units to be employed anywhere on the battlefield including direct assaults against prepared positions. This capability would also be suitable for all peace support operations. However, such forces are inherently more expensive to procure and maintain.

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Changes Already Initiated Within the Army

19. The 1997 Defence Assessment confirmed Army's outputs, and its equipment deficiencies. Rectification of Army's critical deficiencies has priority within the Defence Capital Plan (DCP), both within the funding envelope, and in terms of early implementation of Army's equipment projects.

20. Using the material produced and endorsed in the 1997 Defence Assessment, Army continued to develop its warfighting concepts, doctrine, and command philosophies and operational structures. An integral part of this development was to ensure that the proposed equipment procurement programmes on the DCP could be effectively integrated with these new concepts, doctrine and structures. Army has commenced a series of "Battle Labs" under the name of the "Tekapo Manoeuvres" to operationalise and test the validity of its fighting concepts, initially at company level.

21. Army has also started to develop an Operational Analysis capability. This will be used to test the synergy, performance and effectiveness of the proposed organisations, types and scales of equipments, and proposed tactics at battalion and higher levels. This capability will also be an important means of identifying the possible implications of these developments on our ability to operate effectively with our defence partners.

The Motorisation of the Army

22. The major conclusion from both Army's internal study and a comparison with the doctrines and capabilities of our allies confirmed Army's need to motorise its infantry and reconnaissance elements to meet the generic military capability defined in SONZD 97, and to remain credible. Motorisation of the Army would ensure interoperability with our principal defence partners across a broad (but not complete) range of operational tasks and environments.

23. Motorisation would therefore ensure that Army's units could meet Government policy goals (acknowledging some operational limitations), and be affordable. This includes meeting the concerns of our traditional defence partners about New Zealand's combat and peacekeeping capabilities, and improving the safety of personnel during the conduct of operational tasks. Whilst mechanisation of the NZ Army is an option, it is considered to be beyond the level of capability required to meet NZ's Defence Policy goals. This excess of capability is also not cost effective when the significantly higher through-life costs are considered.

Types Of Infantry Carrying Vehicles.

24. There are three basic categories of vehicles which can provide protected mobility to manoeuvre elements: tracked armoured vehicles such as the M113 (generically known as APCs) wheeled armoured vehicles such as the "Light Armoured Vehicle" or LAVs (generically known as Infantry Mobility Vehicles or IMVs), and protected trucks such as the Australian Bushmaster. A brief description of these vehicle types, together with a consideration of their operating characteristics is attached as Annex A

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25. In summary the IMV is the NZ Army's preferred vehicle type when the aspects of operational effectiveness and through-life costs are compared. The APC tracked vehicles are significantly more expensive to operate over an anticipated 25 year life span, and the level of protection afforded by armoured trucks does not satisfy our requirements.

26. It is therefore intended that the equipment selection process used to procure the armoured personnel carriers and FSVs (which will use the same hull as the IMV) is restricted to only IMV type wheeled vehicles. Such a decision will provide "the market" with a realistic indication of the capability NZ requires, and will simplify the short listing of possible contenders.

27. **Numbers of Vehicles.** To ensure that the infantry battalion group that was deployed could be effectively sustained for commitments longer than six months, the second infantry battalion should be held at the same level of training, using the same equipments. To achieve this, approximately 127 IMVs and 24 FSV would be required. It is not intended to equip the third battalion of the Brigade Structure with IMVs and FSV. It is considered that this can be achieved during the three to five year warning period required to mobilise the Brigade Structure.

28. **A Change In Project Scope.** The 127 IMVs and 24 FSVs needed to motorise the two infantry battalions and their supporting elements is a significant increase in the number that Cabinet gave Approval-in-Principle to acquire (STR (98) 34 dated 11 Mar 98 and its supporting document). The Cabinet Paper anticipated procuring protected mobility, using an APC type vehicle, for a sustainable company group lift within a foot-mobile battalion. It indicated that 69 APCs and 12 FSV were sought to provide this capability. Modern trends now indicate that this method of operations is loosing its relevance, for the reasons detailed above.

Cost Implications

29. **IMVs/FSVs.** The intention to motorise the two Regular Force infantry battalions of the Army has significant cost implications when the funding provisions of the Defence Capital Plan (DCP) are considered. The DCP makes provision for NZ$212 million, excluding GST. When the indicative costs for Army's intended scale of purchase IMVs and FSVs are considered, the project cost could rise to as high as NZ$408 million, excluding GST, depending on the vehicle selected, and costs that emerge from the tender process.

Impact On Related NZDF Projects

30. Implementation of the Motorisation Project will has effects on three other Priority One projects on the DCP. These effects can be summarised as follows:

a. **Military Sealift Ship (MSS).** The motorisation of the Army will significantly increase the number of vehicles requiring deployment to, and possibly within, a theatre of operations. The motorisation project therefore reinforces the importance of completing the modifications to the MSS. The modified MSS will be able to fulfil the strategic sealift needs of the NZDF.

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b. **C130 Tactical Transport Aircraft Replacement Project.** Motorisation of the Army will not reduce its needs for support from fixed wing tactical transport aircraft. In addition to the strategic transport tasks the aircraft performs, the following operational and tactical level tasks for this type of aircraft remain the ability to:

(1) resupply a force from the air (the quantities of stores, ammunition and fuels this will involve will increase when supporting a motorised force);
(2) move reinforcements and replacement equipment into a tactical area;
(3) conduct tactical troop movement within an area of operations;
(4) conduct medical evacuation from an operational theatre; and
(5) deploy special forces by parachute.

c. **Utility Helicopter Life Extension Project.** Army will still require support from utility helicopters, once motorisation is achieved. This will be particularly important where the area of operations is not conducive to vehicle movement, but where rapid troop movement or logistics resupply is necessary within a benign environment (eg: Bougainville or the South Pacific). Similarly, when operating as a motorised force, Army will still need to move platoon group sized forces within the indirect fire envelope of the force; conduct reconnaissance, command and liaison tasks; provide logistic support; and provide medical evacuation. Helicopter support will also be required to support counter terrorist training and operations.

OPTIONS TO ACHIEVE MOTORISATION OF ARMY

31. There are three options available to achieve motorisation of the Army. These are defined below, together with the broad policy and cost implications for each.

32. **Option One.** Government could increase the funding provision to enable the IMVs and FSVs to equip two infantry battalions to be procured in one buy. This could be achieved by increasing the money allocated in one of two ways. Additional cash could be injected now specifically for this project. The alternative would be to authorise money planned for later in the Defence Capital Plan to be used now, with the additional cash injection occurring towards the end of the Defence Capital Plan timeframe (leading up to FY 2007).

a. **Policy Implications.** Such a procurement strategy would provide commonality of equipment across both battalions. This would:

(1) provide a deployable and sustainable battalion group, able to meet intended policy outcomes, and which is seen as both credible and usable by our defence partners;
(2) enable the reinforcement to the battalion group to arrive in the unit with a high level of skills in motorised operations, both during mobilisation in NZ and once the force is deployed;
(3) enable the battalion group commitment to be sustained by rotating the complete battalion at the time of change; and
(4) provide a high degree of certainty that a one-shot brigade deployment could be achieved within the 3-5 years warning time – there would be

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a higher level of skills in motorised operations in a large part of the force.

b. **Cost Implications.** As already noted, the DCP makes funding provision for NZ$212 million, excluding GST. This option would cost in the order of NZ$408 million, excluding GST, requiring a cash injection of approximately NZ$196 million, excluding GST.

c. **Assessment.** This would be the preferred method of procurement, if funding were not a constraint. Within the current DCP, this option is considered unrealistic.

33. **Option Two.** Government could purchase all the FSVs and sufficient IMVs to equip one battalion group, plus an additional company's lift of IMVs for the second battalion.

a. **Policy Implications.** Such a procurement strategy would:

(1) provide a deployable and sustainable battalion group, able to meet intended policy outcomes, and which is seen as both credible and useable by our defence partners;

(2) have an adverse impact on the training of reinforcements, particularly during mobilisation. This could increase the mobilisation time required, and complicate the training patterns of the reinforcement/rotation unit in NZ during the commitment;

(3) require the battalion group commitment to be sustained by rotating the force a company at a time;

(4) ensure that the higher technology equipments (the FSVs) would all be purchased in one buy, ensuring that that capability would be sustainable both operationally and logistically. All the turrets would be of one type;

(5) lead to long term training implications for the Army, as it would have two battalions training for different types of operations – one motorised and the other foot mounted;

(6) increase the risk that the vehicles could not be sustained at a level where there are sufficient to maintain the force in theatre, acknowledging the probability of vehicle casualties (both battle and non-battle), and to sustain training for reinforcements and rotation requirements; and

(7) provide a lower degree of certainty that a one-shot brigade deployment could be achieved within the 3-5 years warning time – there would be lower levels of skills in motorised operations in the force.

b. **Cost Implications.** This strategy would be in the same order of magnitude as the funding provision of NZ$212million, excluding GST, in the DCP. The exact costs will only be able to be identified after the tender process has been completed.

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d. **Assessment.** This option contains significant risk and longer term loss of flexibility for the Army. It is therefore considered the weakest of the three options.

34. **Option Three.** Government could purchase the vehicles in two tranches, using Option Two for the initial purchase, and acknowledging that the remainder of the vehicles to meet Army's requirement would be purchased later. This would result in a second project being introduced to the DCP for the second vehicle buy in the out-years. In the short term, this would be classed as a Priority Two project.

a. **Policy Implications.** The policy implications are the same for those in Option Two in the short term, but would then change to those in Option One with the introduction of the second tranche of vehicles. This would simplify the training regimes in the two infantry units, whilst simplifying the reinforcement/rotation problems and vehicle sustainment issues incurred in Option Two.

b. **Cost Implications.** There could be higher costs in this strategy than those indicated in Option One, because of the time interval between the two purchases. Similarly, there may be a need to buy a different range of spares, as the second tranche of vehicles will have been built to a different build specification (a fact of modernisation of a design over time).

c. **Assessment.** This option provides a balance between risk and operational effectiveness, when considered over the long term. In the short term, there is some risk, but this is considered acceptable as long as the second phase of the purchase is completed within the next five to seven years.

Defence's Preferred Option

35. Acknowledging the constraints of the approved DCP, Defence's preferred strategy is Option Three, the purchase of the vehicles in two tranches.

CONSULTATION

36. The Department of Prime Minister and Cabinet, the Ministry of Foreign Affairs and Trade, and Treasury have been consulted on this proposal.

Treasury Comments

37. Treasury has questioned how the second tranche of vehicles will be funded, if Defence's preferred procurement strategy is approved.

38. **Comment.** The timing of any second phase procurement would be subject to the availability of funding and its prioritisation against other projects.

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RECOMMENDATIONS

39. It is recommended that you:

a. **APPROVE** the intention to change the concept of operations of the New Zealand Army to a motorised infantry force, to be carried out progressively as funds are available;

b. **APPROVE** a change in scope for CAB (98) M 10/5B(4) (Armoured Vehicles) for the replacement of armoured vehicles to reflect an increase in the number of vehicles to 24 Fire Support Vehicles and sufficient Infantry Mobility Vehicles to equip one battalion group, plus an additional company's lift of Infantry Mobility Vehicles for the second battalion, at an estimated cost of NZ$212 million, excluding GST;

c. **NOTE** that the Ministry of Defence intends to restrict the tender process to wheeled armoured vehicles;

d. **NOTE** that a submission will be made to seek Approval-to-Commit funds once a preferred supplier has been identified and detailed costs established;

e. **NOTE** that the authority to adjust the Ministry of Defence's Appropriation Purchase or Development of Capital Assets by the Crown will be sought as part of the further submission to commit funds; and

f. **NOTE** the intention of the New Zealand Defence Force to introduce a new project into the Defence Capital Plan within five to seven years, being the purchase of the remaining Infantry Mobility Vehicles to complete the motorisation of the Army.

Hon Max Bradford
Minister of Defence

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ANNEX A
MOTORISATION OF NZ ARMY
DATED 17 APRIL 99

Types Of Infantry Carrying Vehicles

1. **Protected Trucks.** Cabinet has agreed the minimum level of protection necessary for Army's armoured vehicles. Any armoured vehicle being considered for procurement must be able to provide the occupants of the vehicle with protection against 12.7 mm (.50 cal) armour piercing (AP) machine gun fire. The protected truck fails to meet this criterion. It would therefore not provide the level of survivability necessary to enable a unit equipped with them to undertake the range of tasks necessary to achieve Government's policy goals, in either a war-fighting or peace support/enforcement environment at an acceptable level of risk. In light of this, this vehicle type has not been considered further.



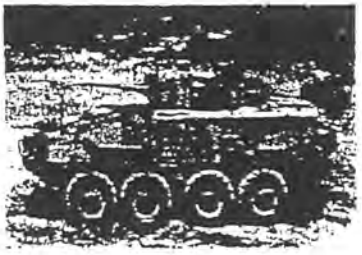
Australian Bushmaster Protected Truck

2. **Wheeled Versus Tracked Armoured Vehicles.** Both wheeled (IMVs) and tracked (APCs) vehicle will meet the majority of the operational effectiveness criteria considered appropriate for the NZ Army's manoeuvre elements. However, IMVs do have a number of significant advantages over their tracked counterparts:



M113 Armoured Personnel Carrier

a. **Self Deployment.** There will be times when the area of operations intended for the NZ Force is physically removed from the point of disembarkation by considerable distances (in excess of 150km). IMVs can "self deploy" quickly and with greater reliability over these distances. APCs would require significantly more time to achieve this movement (with significantly greater logistic burden due to vehicle breakdowns), or require transporting by rail or flat bed trucks. Either of these deployment methods could impose significant burden on the wider force, the first a time burden and the second a logistical one.



LAV III Fire Support Vehicle (as shown) LAV III Infantry Mobility Vehicle (Hull Only)

b. **Growth Potential.** The IMVs being considered are all of modern technology (1990s). They therefore offer significant growth potential across the 25 year life of the vehicle. The technology in the APCs of comparative purchase prices (such as the M113 family) is of 1960s vintage. These APCs would therefore be at the end of their growth potential as they enter service with the NZ Army, and could not be as readily adapted to the changing needs of the vehicle through their life.

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c **Vehicle Serviceability.** IMVs have a higher Mean Time Between Failure (MTBF), generating approximately 95% availability. APCs' MTBF is approximately 75-80%. This means that fewer IMVs would need to be purchased for the "Repair and Maintenance Pool" to maintain an effective and sustainable capability.

a. **Levels of Protection.** Whilst both vehicle types meet the Cabinet directed level of protection against direct fire weapons, the IMV is able to provide better protection against mines. The bottom of the IMV's hull is shaped to minimise the effects of blast. The vehicle can loose up to two of the four wheels on one side of the vehicle and is still able to move. APCs have a flat hull. Whilst additional armour can be applied to the APC's hull to reduce the effects of mines inside the vehicle, this increases the weight of the vehicle and therefore lowers its speed. If a mine cuts a track, the vehicle can not move.

b. **Soldier Effectiveness.** Wheeled vehicles give a significantly softer and smoother ride for the soldiers that will dismount. The result is a soldier who has a higher degree of operational effectiveness at the time he/she needs it – dismounted completing the task.

c. **Environmental Considerations.** Wheeled vehicles will be kinder to the environment. This is particularly important when considering the sustainability of Army's training areas in NZ, and is particularly relevant when considering the use of private land for training.

d. **Training Considerations.** Operator and maintenance training is quicker for wheeled vehicles.

e. **Unit Locations.** If the two battalions are equipped with wheeled vehicles, they can remain based in their current locations (Linton and Burnham). If the battalions were equipped with tracked vehicles, both battalions would have to move to Waiouru. This movement would incur significant additional infrastructure costs.

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CONSULTATION ON CABINET AND CABINET COMMITTEE SUBMISSIONS

Certification by Department

DEPARTMENTS CONSULTED: The attached submission has implications for the following departments whose views have been sought and are accurately reflected in the submission:

DPM+C, MFAT, TREASURY, Ministry of Defence

DEPARTMENTS INFORMED: In addition the following departments have an interest in the submission and have been informed:

OTHERS CONSULTED: Other interested groups have been consulted as follows:

Signature	Name, Title, Department	Date
[signature]	D.W. HILL, DCDS, HQ NZDF	9 / 4 / 99

Certification by Minister

Ministers should be prepared to update and amplify the advice below when the submission is discussed at Cabinet/Cabinet committee. Such clarification must be provided on all proposals with legislative implications.

Consultation at Ministerial level

The attached submission:

- ☑ does not need consultation with other Ministers
- ☐ has been the subject of consultation with relevant Ministers including, as appropriate, independent Ministers

Consultation with Government MPs and supporting Parliamentary parties

- ☑ does not need consultation with the National caucus or with non-National MPs supporting the government on confidence and supply
- ☐ has been/will be the subject of consultation with the National caucus and with the following parties supporting the government on confidence and supply (detail if appropriate):
  - ☐ ACT
  - ☐ Independents
  - ☐ Mana Wahine
  - ☐ United

Other consultation at Parliamentary level

- ☑ does not need consultation at parliamentary level
- ☐ has been/will be the subject of consultation with MPs and parties represented in Parliament, not aligned with the government (detail if appropriate)

Signature	Portfolio	Date
[signature]	Defence	14/ 4 / 99

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NEW ZEALAND
MINISTRY OF DEFENCE
ARMOURED VEHICLE PROJECT
IV&V REPORT

.....

Mr T Rochester CEng

Consultant

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Mr C J Maughan CEng

Manager, Risk Management Group

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Management Summary

The New Zealand Ministry of Defence (MoD) has initiated the Armoured Vehicle Project to replace the New Zealand Army fleet of armoured vehicles. Government approval has been given in principle for the MoD to seek tenders, select a preferred tenderer and to determine accurate costs for future consideration.

HVR Consulting Services Limited (HVR-CSL) has been engaged by the MoD to undertake an Independent Verification and Validation (IV&V) of the User Requirement documentation (URD) that will be used for the acquisition process. This report presents the principal findings of the IV&V.

The HVR-CSL IV&V of the URD has taken the following main lines of approach:

- **Detailed Review of URD and Request for Tender (RFT) documentation** - detailed comments on the URD based on the experience of HVR-CSL reviewers (eg. to avoid subsequent requests for clarification from tenderers).
- **Development of Hierarchical Structure** - decomposition of the URD and supporting RFT documentation into a structure that represents how the documents are written and hence how the tenderer will respond.
- **Review of "flow-down" of requirements from Fundamental Documentation** - comments on the effectiveness with which implied requirements, from fundamental documentation (eg. the Force Development Proposal), have been "flowed down" to the URD.
- **Review by virtue of Meetings with key staff (Army & MoD) and Visits to key Units.**

The principal objective has been to answer the following questions:

- An indication of where the defined capability is not available 'off the shelf' and hence introduces development implications.
- Indicate the achievability of the User Requirement.
- Identify any performance or safety improvements that are required.
- Identify any opportunities for cost savings.
- Identify any omissions, duplications, contradictions, errors or need for rationalisation or clarification.

As a result of the IV&V conducted on the New Zealand Army User Requirement for the Armoured Vehicle the following key conclusions and recommendations have been developed.

- Following the completion of the corrections and amendments identified during the course of the IV&V, and documented within this report, the Armoured Vehicle User Requirement will be a world class document. It will be ready for release to tender.
- There is a widespread stated belief in the Support Organisation that facilities and equipment for Support and Training cannot be identified until the Prime Equipment is known. This blatantly is not true, and much generic work can take place, setting in place of working groups and outline requirements (eg. delivery schedules).
- Infrastructure needs are not yet defined, and only in part are they portrayed in Development Plans for those Camps affected by the AV acquisition.

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- The requirements of the New Zealand Army to equip two battalions with armoured mobility and fire support vehicles is accurately reflected in the User Requirement. A new merged "NZMR (New Zealand Mounted Rifles)" organisation, embodying 1st & 2nd Regiments (1RNZMR and 2RNZMR), essentially an Infantry organisation with strong Firepower Support and, later, with introduction of the LOV (Light Operational Vehicle), a reconnaissance capability, is awaiting only ratification by CGS (Maj Gen Dodson) for the merger to be widely communicated.

- The User Requirement reflects an accurate and realistic flow down of requirements as defined in the fundamental policy documentation examined.

- The 'essential requirements' of the User Requirement are available off the shelf and are reasonable. There is no evidence of the requirement being 'gold plated'.

- There is an urgent need, in parallel with the tender process, to identify all infrastructure needs, set requirements into Development Plans for Linton, Burnham, Waiouru and Trentham Camps, and involve contractors for civil engineering works at the earliest opportunity.

- Organisationally, there is an immediate need for formalisation of a high level AV Master Transition Plan for introduction of the AV into service, along with sub-plans for individual Units/sites. The decision on where the first AVs are to be introduced into service (Trentham or Burnham) should be made as soon as possible to facilitate the planning process.

- The requirement for new operational skills should be assessed, along with new maintenance trades. Recruitment needs to be commenced now and preparatory training plans implemented.

A review of the vehicles currently in production and available to meet the User Requirement has been conducted. This has shown that there are only two vehicles that will meet all aspects of the requirement, the manufacturer of a third declaring at a late stage that it will not participate. One of the two, although meeting basic essential requirements, is marginal in terms of combat weight and growth potential. Therefore a key recommendation of the independent IV&V is that:

- The LAV III, as a Prime Equipment, is technically way ahead of the competition. Assurances on Price and Support Package are needed. NZ should solicit the assistance of the Canadian Government in negotiating a best-value extension of the current Canadian Army order placed upon GM, in conjunction with a separately-negotiated contract for Support. Agreement in principle to proceed with this course of action will be required from CGS, and the Minister of Defence, and it will be necessary to draft a paper for this approval.

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1. Introduction

1.1 Background

The New Zealand Ministry of Defence (MoD) has initiated the Armoured Vehicle Project to replace the New Zealand Army fleet of armoured vehicles. Government approval has been given in principle for the MoD to seek tenders, select a preferred tenderer and to determine accurate costs for future consideration.

HVR Consulting Services Limited (HVR-CSL) was engaged by the MoD to undertake an Independent Verification and Validation (IV&V) of the User Requirement documentation that will be used for the acquisition process. This report presents the principal findings of the IV&V.

HVR-CSL was also engaged to provide a Project Risk Management Plan for the Armoured Vehicle Project. This is the subject of separate deliverables.

1.2 Scope of the IV&V

1.2.1 Background to the User Requirement Documentation (URD)

The URD is a key document for specifying the requirements process during all phases of the procurement cycle from Staff Target (Force Development Proposal) to disposal. The URD defines the function, operational features and performance required of a system, sub-system or item of equipment with defined interface conditions, together with the acceptance criteria which will be used to judge its acceptability. The management (and commercial) procedures which must be in place to satisfy the Staff Target must also be specified within an overarching Request for Tender (RFT).

1.2.2 The Hierarchical Structure

Due to the number of issues to be considered in the URD, HVR-CSL has developed a methodology in which the requirements of the system are first decomposed into the main 'objective functions' of the system under consideration. These are usually technical, managerial and commercial. The main objective functions, termed attributes, are then identified by lower order attributes which make up the objective function. These, in turn, may be composed of further attributes at a lower level. In this way, the requirements of the URD can be grouped into a hierarchical structure composed of 'sets' where the attributes in each set are complementary and repetition avoided. The end attributes in the hierarchical structure therefore represent all the issues addressed in the URD.

1.2.3 Independent Verification and Validation

HVR-CSL first decomposed the URD into a hierarchical structure based on the format in which the URD is written, and not on how it should be written, as the tenderer will respond to what he 'sees', not what he 'thinks'. Based on the content of the hierarchical structure, HVR-CSL then verified the following:

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- Does the URD address all the requirements of the Staff Target plus any other 'target' documents.
- Is there any duplication in the URD such that the same equipment, for example, may be represented in different scenarios under different configurations
- Are there any omissions in the URD
- Are all the related management plans in place e.g. safety plan, quality plan etc
- Is there any ambiguity in the way certain issues, technical or management, are addressed in the URD
- Is each objective function addressed down to the same level i.e. are the objective functions equally balanced in the URD
- Are 'critical' elements, compared to 'desirable' elements, in the URD treated at the appropriate level in the hierarchical structure
- Assessment of applicability of COTS and MOTS (Military off the shelf) to meet the requirement.

Once the hierarchical structure of the URD was in place, HVR-CSL was in a position to validate the requirements of the URD with respect to, for example, the value placed on certain end attributes. Experience has shown that the Services often place high levels of expectation, which are often difficult to justify, on equipment that operates in a scenario for which this level of expectation is not required. Not only does this situation apply a higher level of demand on industry to meet this requirement, it also places unnecessary costs on the Service, not only on procurement but also possibly on R&M, ILS etc.

A benefit of the development of the hierarchical structure is that once in place the MoD has a structured 'checklist' (based on the end attributes of the hierarchical structure) on which to assess and validate the responses from industry. Due to the format of the hierarchical structure, the responses from industry can then be judged on a 'like for like' basis.

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2. Conduct of the IV&V

2.1 Basis of the New Zealand Army URD

The URD is based upon the Canadian Army requirement for LAV, but the DIDs are based upon those used in the New Zealand (NZ) "Sirius" Air Programme. The NZ Armoured Vehicle (AV) buy should be essentially OTS (Off-The-Shelf) and NZ believes that, within the available budget, it does not really need anything that has not been demanded by other Armies before it. The available budget should be used for procurement and getting an acceptable equipment into service, rather than any special development programme (note that Contractual Documents suggest that preference will be given to a vehicle which is already in-service with an ABCA country (desirable)). At the IV&V stage, the priorities of the URD are to accurately reflect the User Requirement, but also to allow the MoD to generate a genuine competition among tenderers, and therefore ensure best value for money for the NZ Army.

2.2 Overall Approach to the IV&V

The HVR-CSL IV&V of the URD has taken the following main lines of approach:

- **Detailed Review of URD and RFT documentation** - detailed comments on the URD based on the experience of HVR-CSL reviewers (eg. to avoid subsequent requests for clarification from tenderers).
- **Development of Hierarchical Structure** – decomposition of the URD and supporting RFT documentation into a structure that represents how the documents are written and hence how the tenderer will respond.
- **Review of "flow-down" of requirements from Fundamental Documentation** - comments on the effectiveness with which implied requirements, from fundamental documentation (eg. the Force Development Proposal), have been "flowed down" to the URD.
- **Review by virtue of Meetings with key staff (Army & MoD) and Visits to key Units.**

The intent of each line of approach is developed in more detail in the following sections.

2.3 Detailed Review of URD and RFT Documentation

The review is based upon the URD as presented by NZ MoD, and aims to cover:

- Omissions
- Duplications
- Contradictions
- Where capability is thought not to be available off-the-shelf (there are development cost implications)
- Achievability (highlighting where not readily achievable)
- Suggestions for rationalisation of the format
- Suggestions for clarification
- Suggestions to avoid ambiguity
- Suggestions that improve safety

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- Suggestions that may reduce whole life cost
- Queries that have no clear answer, and discussion with NZ parties is needed
- Minor typographical errors

2.4 Development of Hierarchical Structure

To assist the conduct of the IV&V, the URD and RFT documentation has been decomposed into a hierarchical structure based on the format in which the RFT has been written. This aspect is important as the tenderer will respond to what he 'sees' and not what he 'thinks'.

The generation of a hierarchical structure identifies a 'home' for each element of the URD and RFT that is to be considered in the tender document. The hierarchical structure has been used during the IV&V to target the examination and review of the URD and RFT documentation.

2.5 Review of "flow-down" of requirements from Fundamental Documentation

In the absence of fully detailed Mission Scenarios for the Armoured Vehicle Family, which are becoming more widely used in Defence & Aerospace Programmes and which could reap benefits if engineering development was involved, but would be time-consuming to generate; the following documentation was judged by HVR to be the most fundamental documentation describing the requirement- essentially those documents which describe the function or purpose of the Armoured Vehicle Family. The documents reviewed include:

- "Force Development Proposal" (for the Armoured Vehicle Programme).
- The paper "Motorisation of the NZ Army", the Cabinet Strategy Committee.
- The NZ Land Transport Safety Authority Regulations.
- "Army Mobility Policy Study" (the "Jameson Review").

2.6 Review by meetings with key Staff (Army & MoD) and visits to key Units

During the visit of the HVR Team to New Zealand a number of visits to Operational, Training & Support Units, and meetings with Senior Army & MoD Staff, were completed. In support of the Validation Process, the main aim of these visits was:

- To ensure that the URD reflects an AV requirement that could be operated by a new merged "NZ Mounted Rifles" organisation.
- To gather information on the AV Transition Plan, so that the implications can be reflected in the AV URD as necessary.
- To ensure that the URD reflects Prime Equipment that could be supported by a revised Support Organisation, plus Support Requirements in so far that they can be specified, i.e. independent of Prime Equipment, but dependent upon the existing, or likely future, organisation.
- To gather supplementary data on suitability of the AV requirement in an Army 2005/2015 context.
- To make an initial assessment of current & possible future training areas, and implications for the URD.
- To gather data on the main Risks to the Programme (reported separately).
- To gather data on anticipated AV Growth and implications for the AV URD.

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- To pick-up other miscellaneous points for the AV URD.

As a consequence of the visits and meetings HVR-CSL, in this report, makes a number of recommendations, for consideration by the Project Manager, Armoured Vehicle Project.

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3. Detailed Review of URD and RFT Documentation

3.1 General

The total Request for Tender (RFT) documentation package is composed of Parts 1 through 6 as detailed below:

- Part 1 - Introduction to the Tender Process
- Part 2 - Rules of Tenders
- Part 3 - Tender Deliverables
- Part 4 - Form of Tender
- Part 5 - Statements of Requirement
- Part 6 - Conditions of Contract

An initial examination of the RFT package indicated that the User Requirement Document (URD) is structured to a fine level of detail, possibly based on an existing vehicle type of one of the potential tenderers for this contract (now known to be LAV III). If this contract is to go out to open tender, other such tenderers may be inhibited in satisfying the URD without fundamental design changes to their prospective vehicles.

However, for the purposes of this IV&V it is accepted that the RFT will be issued to potential tenderers largely based upon its current structure. The IV&V was therefore targeted towards ensuring that any changes necessary were commensurate with making the URD generic such that it can be met by a wide variety of COTS vehicles. These changes, when incorporated, should ensure an open contest and hence the delivery of a competitive price.

All aspects of the RFT package have been examined although the bulk of the effort has been directed towards the URD and the technical issues addressed therein. The following comments apply to the total RFT documentation with specific issues relating to the individual Parts being addressed in separate sections.

In reading an RFT one would normally find ready access to the management aspects associated with the equipment procurement. In this RFT, however, the management aspects are mixed with commercial aspects and some technical aspects, in Part 6, which covers the 'General Conditions of Contract'. If the management, commercial and some technical aspects are to remain in Part 6, then there is a need to segregate these aspects into three sections for easy access by the tenderers.

Throughout the RFT there is reference to several Annexes without clear reference to which part of the RFT these annexes belong. It is recommended that the documentation be further reviewed to ensure that all such references are clear and unambiguous.

The generation of a hierarchical structure identifies a 'home' for each element of the RFT that is to be considered in the tender document. It is recommended that the hierarchical structure

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is presented in Part 1 of the RFT with a brief description that the tenderers are to address each 'line item' in their response to the RFT. Failure to do so (especially on 'essential' items) would nullify their tender. The inclusion of such a RFT 'road map' will improve the tenderers comprehension of the package and hence the quality of his submission.

Likewise, when conducting tender assessment against a structured RFT, the MoD can assess each tender in 'like manner', with a clear audit trail; useful should there be some dissatisfaction from a bidder. A hierarchical structure also enables the MoD to conduct a logical marking system in which a merit mark, confidence mark and sensitivity mark can be assigned against each line item.

The hierarchical structure has also been used during the IV&V to target the examination and review of the RFT documentation. These aspects are addressed more fully in the sections that follow.

It should be recognised that all references to documentation made in this IV&V report were correct at the time of writing. As the URD and RFT were subject to continuous review and edit during the period of the IV&V some references may now be in error although the content of the comment made remains valid and should be traceable.

3.2 Part 1 - Introduction to the Tender Process

The inclusion of the hierarchical structure within the RFT package would significantly assist the tenderers in their comprehension of the requirement. It can be used as a 'road map' to assist in navigating throughout the URD and RFT documentation and is available to use as a check for compliance (as all essential and desirable attributes are clearly marked. Finally, the structure is available for use by the MoD as an aid to the tender assessment process.

The hierarchical structure is provided at Annex A, with a soft copy (in Microsoft Excel and Word) handed directly to the Armoured Vehicle Project Manager.

3.3 Part 2 - Rules of Tender

Section 2.2.1 identifies how tenderers are to indicate their compliance with each clause of the Rules of Tender, the User Requirement and the Support Requirement. Examples of the respective statements of compliance are attached as Annexes C, D and E to the RFT Part 2.

- The examples at the Annexes are not complete and appear to be for illustration purposes only. If true, this should be stated. It is recommended that the tenderers be referred to the appropriate sections of the hierarchical structure and told to indicate compliance against each line item. In addition, the MoD may like to consider the provision of a diskette containing the compliance matrix for population by each tenderer. This will ease the administrative burden of establishing initial compliance for each submitted tender.

Section 2.2.8 refers to Tender Pricing, and states that quotations are to be submitted as detailed in the Price Schedule at Annex F.

- It is recommended that the MoD explain to the tenderers, in the introduction to the Annex, the purpose and intent of the Price Schedule. It is believed that the purpose is to:

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- Identify a total price for each vehicle, together with a detailed breakdown of how that price has been determined, plus

- Identify a price for optional (or desirable) capability that the MoD may or may not decide to fit, may use as a basis for negotiation with the supplier, or may decide to source separately.

- This approach will ease the burden of initially completing the price schedule and should remove the need to re-price should the MoD decide to exercise the deletion of any capability.

- Examination of the Annex indicates that it is not clear how to read across to the User Requirement. It is recommended that the Annex be amended to include a cross reference for each line item to the User Requirement. This will serve two purposes. Firstly it will remove any ambiguity from the mind of the tenderers as to what each line item is deemed to include and, secondly, it will ensure, from the MoD perspective, that no items of the requirement have been accidentally omitted (see revision suggestion at Annex B).

- A statement should be made in the introduction to the Pricing Schedule that the cost of each line item is to include the installation, integration and commissioning of each sub system. A further line item is to be added for final commission and test of the total vehicle (see revision suggestion at Annex B).

- A final option to consider is the assignment, by the MoD, to each of the elements in the pricing schedule of a 'performance' value. This weighting will allow the MoD to 'see' what the value of delivered performance is (performance per $) and facilitate value engineering assessments of the different options.

An amended Pricing Schedule (part only) is provided at Annex B to this report. It has been re-ordered to reflect the alignment of the User Requirement. This must be reviewed and completed in total, once the URD has been through its final amendment, to ensure that all source references are correct.

Section 2.4.3 refers to the criteria by which tenders will be evaluated by the Crown. A list of criteria is provided with the proviso that it is not exclusive and that it is provided for guidance purposes only.

- It is recommended that this section be replaced with the criteria and weightings that the MoD intend to use. This will ensure that the tenderers responses are focussed on the key areas (as opposed to a 'shotgun' across all requirements), as deemed by the MoD, and will contribute towards more balanced proposals offering better value. Such an approach is deemed particularly relevant when the procurement is for an OTS product, and little can be done to alter the technical compliance of the offerings.

Finally, Annex A – para c. – 'ready disassembled' should read 'ready disassembly' (typo only).

3.4 Part 3 - Tender Deliverables

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This section forms a listing of all deliverables expected in the tender. These references should all be checked in line with the amendments made to the URD and RFT documentation during the IV&V. This also applies to the attached Data Requirements List.

3.5 Part 4 - Form of Tender

No comment required.

3.6 Part 5 - Statements of Requirement

3.6.1 Part 5.1 – User Requirement

A detailed review of the URD has been undertaken. As potential changes to the URD have been identified they have been discussed with the Armoured Vehicle Project team. All comments have been recorded together with any agreed action following discussion.

The detailed review comments are provided in full at Annex C. The following notes will aid the comprehension of the reader:

1) Comments with no asterisk are comments generated prior to and during initial working session at HVR-CSL, Alton (02 June 1999).
2) "*" indicates comments generated after initial working session at HVR-CSL, Alton (2 June 1999).
3) "**" indicates comments added after "interim comments" were e-mailed to NZ MoD on 16 June 1999.
4) Bold bracketed text after comment denotes the action agreed (NFA= No Further Action) following review of 21 to 22 June 1999 with Capt Kelvin Hawley, Manager of Automotive Engineering, NZA, (as leading custodian of the UR) plus Lt Col George Rooks and Maj Steve Wagner, also of NZA.
5) "***" indicates changes proposed after 1st HVR-CSL Review with NZA.
6) "****" indicates changes proposed after re-formatting on 1 July 1999 by the Project Manager, Armoured Vehicle.
7) References are into the issue of the UR current at the above dates.

3.6.2 Part 5.2 – Support Requirement

Spares Holding – The requirement for Spares Holding is defined in 2.1.2 and again in 2.2.1. Both should be checked to ensure that they are not contradictory.

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Maintenance Support – An overview is provided in 3.1, with the doctrine in 3.2, and the requirements in 3.2.5. The use of a civilian contractor to provide Base Repair is alluded to but not explicitly stated. It is recommended that the paragraphs be changed to specifically state the current contractual arrangements with SPEL and William Adams, and the desire for the Prime Contractor to work closely with them, or to suggest alternative arrangements. In addition, the potential for increased use of contractor support forward of Base Repair would be in line with policy.

Storage, Packaging and Labelling – Section 6.1 states the current philosophy for storage of equipment and spare parts, and invites the tenderer to indicate equipment and spare parts that require specialist storage requirements. It is recommend that this section be expanded to include specific reference to the manufacturers recommendations for garaging, deep storage and support equipment.

More detailed comments, in the same format as described for the User Requirement, are provided at Annex D.

3.6.3 Part 5.3 – Data Item Descriptions

Detailed review comments on the Data Items Descriptions, and suggested amendments, are provided at Annex E.

3.7 Part 6 - Conditions of Contract

It is normal in the format of a RFT for the Conditions of Contract to precede the URD ie. interchange Parts 5 and 6.

Section 1.1 provides details of all definitions that are to apply to the contract. It is recommended that additional entries be made to define the terms essential, shall, desirable and should. The same text can also be used to amend the Levels of Requirement in paragraph 6 of Part 5.1, the User Requirement.

An essential (shall) requirement is a criterion that must be met if a tender is to be considered for assessment. Performance designated as essential is deemed to be so important that failure to meet any one essential requirement, even if the tenderer meets all other essential criteria, shall result in disqualification of that tender. The terms essential and shall are to be treated as synonymous.

Desirable (should) criteria are used to promote more sensitive evaluation of tenders that meet all essential requirements. A desirable criterion describes a requirement where performance better than the stated essential level is deemed to have significant operational value. The terms desirable and should are to be treated as synonymous.

Part 6 refers, in many instances, to the Project Director. In other sections of the RFT package the Project Manager is referred to and named. This apparent anomaly requires clarification. The position and role of the Project Director does not appear to have been defined at any stage.

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Section 42.1 refers to Contract Changes and the rules that apply. It is recommend that an additional clause be included that refers to a requirement that, for each change requested, the contractor is to certify that inclusion of the change will have no impact on any schedule of delivery.

As a result of a proposed amendment to DID PROJ-1.3, Project Risk Management Plan, consequential changes to section 18.4 of the General Conditions of Contract would be required. The change required is the addition of a new paragraph, detailed as follows:

18.4.10 A formal Risk Review Meeting, attended by representatives of both the Crown and the Prime Contractor (including sub-contractors), will meet quarterly (or as frequently as the Crown requires) to ensure that risks and their mitigation actions are fully understood, and that responsibility for risk mitigation is agreed. This Risk Review Meeting will be linked to, and form part of, the quarterly Management Meetings (18.2 refers).

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4. Review of "flow-down" of requirements from Fundamental Documentation

4.1 General

The main documents reviewed are:

- "Force Development Proposal" (for the Armoured Vehicle Programme).
- The paper "Motorisation of the NZ Army", by the Cabinet Strategy Committee.
- The NZ Land Transport Safety Authority Regulation.
- "Army Mobility Policy Study" (the "Jameson Review").

4.2 Review of FDP (Force Development Proposal - Ref Army 10001/3/10/Dev approved 14-Apr-99)

Although the UR was not, in the first instance, derived logically from the FDP, there is now close correlation between the two documents.

(Minute-Ref 5c) The requirement for a specialist IMV variant for medical evacuation, referred to in the FDP, has been deleted on the basis that other IMV variants can be reconfigured for this purpose.

(Minute-Ref 8) The assessment of Operating Cost for a 25 year life, to be approximately the same as the original Procurement Cost, is verified as reasonable for a modern armoured vehicle of this type.

(Part I Section 7 (attached note) describes difference between mechanised & motorised forces- latter pertains in the UR.

(Part 1 Section 11- footnote) The FDP reflects the decision taken that the Armoured Vehicle will be wheeled. This decision opens up the possibility of limited vehicle training in "home" locations (Linton & Burnham). This fits fine with some "downsizing" of Waiouru, but requires civil works in Linton & Burnham.

(Part II Section 16)- Reconfiguration of FSV seats (requirement is 4 passengers in rear) for CASEVAC is unlikely to be viable **(****UR Annex C 4a(1): add note to acknowledge this shortcoming in FSV)**

(Part II Section 18) FDP says "…..all variants (including FSV) being derived from the IMV." **(****UR Main body new 5: change text to reflect this?)**

(Part II Section 19a) (**** **UR, including related DID, to reflect this as re-written post-mine-incident performance)**

(Part V Section 40) **(****UR should include this in expansion of support Requirement, including Simulation and conventional training aids).**

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(Annex A 3a(2)) (****UR should reflect required range? Or has this been agreed to be impractical?- 800km in the FDP, currently 450km (essential) & 600km (desirable)- Annex A 9 refers – in discussion it has been agreed that these figures are realistic).

(Annex A 3c) (****UR should reflect power to weight ratio not less than 15 kW/tonne)

(Annex A 3e) (****UR should reflect requirement for automatic transmission, power steering and ABS brakes)

(Annex A 7m) (****UR, when self-recovery is re-introduced', should reflect FDP Essential requirement for self recovery "able to be deployed to both the front and rear of the vehicle")

(Annex A 7n) (****UR, BIT should be reflected in UR 5.2, 4.3 (STTE)-currently no mention)

(Annex A 17) (****UR, VMS (Vehicle Monitoring Systems) should be reflected in UR 5.2, 4.3 (STTE)- currently no mention)

(Appendix 1 to Annex C 6) "……the difference (in prices), that in most cases exceeds 80%, is too significant……" does FDP really mean this? – yes, difference is around 80%.

4.3 Review of paper "Motorisation of the NZ Army" (Cabinet Strategy Committee)

This paper puts "Motorisation" into the global defence context.

- Para 12 quotes Bosnia where, "Kiwi Company, a force one third the size of a battalion, was assigned an area 12.5 times larger than that a complete battalion would reasonably be given, based upon traditional foot mobility. Therefore, the effective increase in the size of operational areas, when compared at battalion level, is a factor of 36 times." The implication is that Motorisation will vastly increase defended area.
- Para 13: "…NZ Army…incapable of operating effectively in anything other than a benign environment, without imposing significant risk on the wider force within which it would work."
- Para 17a: "During movement to the area, and whilst the soldiers are dismounted, the force is supported by FSVs"- motorised units (as opposed to mechanised units) do not participate in penetration of defensive lines, nor in the front line, but rather in flank security operations, and in most Peace Support/ Enforcement Operations.

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- Para 19: ".....to develop its warfighting concepts, doctrine, and command philosophies and operational structures.....ensure that the proposed equipment procurement programmes..... could be effectively integrated with these new concepts". "(The Army) has commenced a series of 'Battle Labs' under the name 'Tekapo Manoeuvres' to operationalise and test the validity of its fighting concepts, initially at company level". OA, with assistance from UK DERA, will be used to "test the synergy, performance & effectiveness of the proposed organisations, types & scales of equipment, and proposed tactics at battalion and higher levels.....and our ability to operate effectively with our traditional defence partners ".

The paper than goes on to justify restriction of the Acquisition to wheeled IMVs:

- Para 24: "protection against 12.7mm AP.....The protected truck fails to meet this criterion"- this supports rejection of early options for the AV Programme such as Bushmaster and ACMAT protected trucks.

- Para 25: "Self deployment (vs rail or flat bed trucks), with greater reliability, to ranges in excess of 150 km" is an implied requirement.

- Para 25c: "IMVs have ...approximately 95% availability . APCs (reliability) is approximately 75-80%. This means that fewer IMVs would need to be purchased for the R&M pool".

- Para 25d: "The IMV is able to provide better protection against mines"

- Para 25e: "Wheeled vehicles give a significantly softer and smoother ride for the soldiers that will dismount....and a higher degree of operational effectiveness....dismounted".

- Para 25f: "...kinder to the environment..."

- Para 25h: "The 2 Battalions can remain in their current locations, Linton & Burnham" (not transfer to Waiouru)

Lastly (Para 35), the paper goes on to outline the preferred option for procurement- ie. in two tranches.

In conclusion, the paper is background to Motorisation and the AV in a global defence context, gives justification for selection of a wheeled IMV solution, and recommends the Acquisition strategy. Although the paper has been important to the URD reaching its current status, there are no further issues for implementation in the URD.

4.4 Review of NZ Land Transport Safety Authority Regulations:

The Regulations were not reviewed in depth, but the following modus operandii has been developed between the Project Manager and the Project Engineer:

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- When leading candidates for fulfilment of a vehicle requirement have been identified, an Inspection Team comprising the Project Manager (or his representative), the Project Engineer, and representatives from NZLTSA (New Zealand Land Transport Safety Authority) and the LTSA nominated inspection authority, currently NZVT (New Zealand Vehicle Test) will visit the premises of the Supplier, or nominated Prime Contractor and, using a NZVT-authorised checklist, confirm the compliance or otherwise of the proposed vehicle with the LTSA regulations.

The LTSA issues a series of LTSA Fact Sheets, which summarise and illustrate the regulations. Although there are to be special provisions within regulations for military vehicles, main points of concern with regard to the regulations include exhaust exit point, lighting positions, driving position (RHS preferred), GVW and axle loading:

- Axle loading (Fact Sheet 13 refers): axle loads are limited to 6 000 kg on a non-steered axle, 6 000 kg on a single steered axle, and 5 400 on each of a pair of steered axles, ie.

Max GVW is:	6x6, two steered axles:	16 800 kg
	6x6, one steered axle:	18 000 kg
	8x8, two steered axles:	22 800 kg

- For given wheelbase; max sum of axle weights (ie. GVW) on two or more axles are:

Wheelbase:3.0-3.3m (eg. VAB, Pandur, Puma 6x6 configuration):	19 000 kg
3.3-3.6m (eg. LAV II, SB BMR configuration):	20 000 kg
3.6-4.0m (eg. LAV III 8x8, Fuchs, CG LAV-300 configuration):	21 000 kg
4.0-4.4m (eg. SIBMAS configuration):	22 000 kg
4.4-4.7m (eg. BTR 80, Ratel configuration):	23 000 kg
4.7-5.1m (eg. Centauro configuration):	24 000 kg

Relative to the supplier-specified combat mass, the only options on which the above LTSA regulations place a constraint are:

SIBMAS	(18 500 constrained to 18 000 combat mass by LTSA regs)
Fuchs	(19 000 constrained to 16 888)
Ratel	(18 500 constrained to 18 000)
Centauro	(25 000 constrained to 22 800)

4.5 Review of "Army Mobility Policy Study" (the "Jameson Review"):

(From brief given by Lt Col George Rooks): the "Jameson Review" attempted to take a fundamental look at the Mobility (Motorisation) requirement. It took a large number of Army Contingencies (or Missions), decomposed them into fundamental roles and tasks, then attempted to assess the effectiveness of various vehicle types to fulfil greater or smaller numbers of these roles & tasks. While the approach was in principle correct, input data had great limitations, and results therefore had limited credibility. It did, however, serve a purpose in confirming the wheels/ tracks decision, established essential requirements for the AV Programme, and supported assessment of ASLAV, when a sole-source route was being considered. The document is therefore largely background, not considered suitable for further, more detailed development (say to compare AV contenders), and has no further material to be read-across to the URD.

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5. Review by meetings with key staff (Army & MoD) and visits to key Units

5.1 Introduction

During the visit of the HVR-CSL team to New Zealand to complete the IV&V of the AVUR (Independent Verification & Validation of the Armoured Vehicle User Requirement), a number of visits to Operational, Training & Support Units, and Meetings with Senior Army and MoD Staff, were completed. In support of the Validation Process, the main aim of these visits was:

- To ensure that the UR reflects an AV requirement that could be operated by a new merged "NZ Mounted Rifles" organisation.
- To gather information on the AV Introduction Plan, so that the implications can be reflected in the AVUR as necessary.
- To ensure that the UR reflects Prime Equipment that could be supported by a revised Support Organisation, plus Support Requirements in so far that they can be specified, i.e. independent of Prime Equipment, but dependent upon the existing, or likely future, organisation.
- To gather supplementary data on suitability of the AV requirement in an Army 2005/2015 context.
- To make an initial assessment of current & possible future training areas, and implications for the UR.
- To gather data on the main Risks to the Programme (reported separately).
- To gather data on anticipated AV Growth and implications for the AVUR.
- Pick-up other miscellaneous points for the AVUR.

As a consequence of the visits and meetings HVR-CSL, in this report, makes a number of recommendations for consideration by the Project Manager, Armoured Vehicle Project. In order that the RFT is not delayed, it is recommended wherever possible that information is forwarded to the tenderer as a separate datapack (again highlighted).

A summary of the main observations and conclusions arising from these meetings and visits is detailed in the following section. Detailed notes, made at the conclusion of each discussion, are provided in full at Annex F.

5.2 Main Observations and Conclusions

The new merged "NZMR (New Zealand Mounted Rifles)" organisation, is likely to embody 1st & 2nd Regiments (1RNZMR & 2RNZMR) - essentially an Infantry organisation with strong Firepower Support and, later, with introduction of the LOV (Light Operational Vehicle), Reconnaissance capability. Commanding Officers, and their Regiments, are well prepared to commence the merger, and only final agreement by CGS (Maj Gen Dodson) is required for the merger to be formalised and widely communicated.

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There is an immediate need for formalisation of a high level **AV Master Transition Plan** for introduction of the AV, along with Sub-Plans for individual Units/sites. The decision on where the first AVs are to introduced into service (Trentham or Burnham) should be made as soon as possible, to facilitate the planning process.

New operational skills should be assessed, along with new maintenance trades; recruitment commenced as soon as possible, and preparatory training plans implemented.

The IMV will be a battlefield taxi and the FSV will protect IMVs when the latter are moving. If FSV encounters non-anti-armour, then it may be more aggressive (eg. some Peacekeeping). AV will facilitate motorised, rather than mechanised (tracked) Infantry. FSV Turret should be digitised, with commanders and gunners capability, and TI and IL well integrated. The AV Programme represents the Army's biggest equipment overhaul since WW2, and the programme is likely to be the largest factor to determine the performance of the NZA for the next 20 years. It is important that the vehicle is at the start of its life in the market, rather than near the end (eg. LAV 3 vs LAV 2), and that the vehicle has been developed in an ILS environment, so that operating, support, and support growth benefits are received (eg. high MTBF). Interoperability with ABCA countries is important (even if NZ is in a collaborative force with Eastern European countries, the ethos, support and re- supply chains are very different).

There is a widespread stated belief that facilities and equipment for Support and Training cannot be identified until the Prime Equipment is known. This blatantly is not true, and much generic work can take place setting in place of working groups and outline requirements (eg. delivery schedule), type of facility and equipment.

There will be centralised Command of embedded support and facilities, at a base level for the Units, with the base level being supplemented by mobile "top-up" or "surge capacity" resources as required. There will be an Annual Directive on Support policy, then a monthly-updated Master Activity Schedule, which forewarns of upcoming exercises and other workload peaks, and allocates priorities.

Garaging: Particularly in view of the fact that NZA Camps are not secure, secure or guarded garaging facilities will be essential. The main weapon (cannon) will be left in FSV overnight and, if IMVs have overhead weapon station, their 0.5 in weapon will, similarly, be left in place. Radio/crypto security is also a major consideration (expansion of UR required), as is the security of laser equipment, particularly rangefinders.

The recent proposal that the UR should reflect IMVs with no "fitted for but not with" capability should be ratified with CGS, then communicated clearly throughout the organisation (clarification in UR required).

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Proposals for Simulation within the AV Programme should be expanded in the UR. Such Simulation must be integrated with the overall Army Simulation Concept, and the proposals for Simulation Centres at lead Units: ie. outline requirement for AV Simulation should be drafted and communicated to GS02 Operational Requirements (Combat) for concurrence.

OA to decide direction in all "Growth" issues, supported by Tekapo Exercises, will be essential in the years 00-01 timeframe. This activity may influence the technical requirements for an AV second tranche buy.

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6. Acquisition Process – The Way Forward

6.1 Background

Towards the end of the IV&V Process there has been concern that some fundamental questions in the Armoured Vehicle Programme Acquisition Process remain to be answered, primarily questions of whether a real competition can be generated, and of the main factors driving the AV configuration. At the same time, confirmation of interest was being sought from potential vehicle manufacturers. The NZAV User Requirement, while based upon the Canadian Government requirement which was fulfilled by LAV 3, is not prescriptive, and indeed gave a real competition in Canada with one or more tracked candidates featuring well in the running. The configuration of armoured vehicles required by many countries of the world today tend to be wheeled (to facilitate self-deployment), large and multi-role capable, yet must often be C130 Aircraft transportable. There is great market demand, yet very few military vehicle products are optimised for this niche. The NZA requirement fits this pattern.

6.2 Alternatives

The NZ Minister for Defence has decreed that the NZAV requirement will be fulfilled by a competitive tendering process. For a decision taken in early 1999, that was the right decision. However, if there are difficulties generating a real competition, a political solution may be worth considering. The big question remains, do we go to competitive tender, or is there really no competition, and should we be concentrating efforts on The Political Solution?

6.2.1 The political solution?

There are increasing numbers of International collaborative programmes US/UK, European, Canadian/US but to name a few, whose main aim is to share cost and risk in the acquisition of defence equipment- and the general public understands, or can readily be convinced of, this. An "ABCA Collaborative Programme" to fulfil the NZ requirement by purchase of Armoured Vehicles, say based upon LAV III and at a keen price, close to that paid by the Canadian Government, could be attractive. Such a purchase would enhance interoperability while ensuring that the latest proven equipment was being purchased.

6.2.2 Why do we want a competition?

The FDP (Force Development Plan) decrees (Part III-Procurement, 21c) that "There is no operational imperative at present that justifies sole sourcing". Acquisition based upon competitive tendering is the most robust method of ensuring that best value is obtained for the NZ Taxpayer. If we go single tender with GM/Canadian Government, how will we know we have the best price from GM Canada? NZ MoD has access to the price paid by the Canadian Government. The licence fee paid is probably a one-off payment for the order, then per vehicle (normal MOWAG arrangement). It would be necessary to confirm this if possible, then a "fair" price estimated, and a NZ contract price negotiated towards this.

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6.3 Which are the contenders?

- Steyr Pandur 6x6
- SIBMAS 6x6
- Patria (was Sisu) 6x6
- GIAT (was Renault) VAB 6x6
- Henschel Fuchs 6x6
- Reunert (was Reumech) Ratel 6x6
- Iveco-OTO Breda Centauro 8x8
- BTR 80 8x8
- BTR 90 8x8
- Mowag/GM Canada LAV III 8x8
- Mowag/GM Canada LAV III 6x6
- Iveco Puma 6x6
- Santa Barbara BMR 6x6
- Cadillac-Gage LAV-300 6x6
- Panhard VCR-2 8x8
- ASLAV 8x8
- Mowag/GM Canada LAV II 8x8

6.4 What factors are driving the vehicle configuration?

A small number of key "Essential" requirements drive the overall configuration of the Armoured Vehicle that will result from the NZA User Requirement as written:

- Growth potential
- Air transportation- C130
- Highway movement- axle loading/ total vehicle mass
- MMP
- Trench crossing
- Weight, balance, stability (post-mine incident mobility)
- Protection
- Carrying capacity (crew & payload)
- Large ramp/rear door
- Reliability/ Availability/ Maintainability/ILS

Growth potential: Factors which may help ensure growth potential are the remaining development life of the vehicle (ie. the vehicle should be proven, but at/near the start of its life). The vehicle, being essentially a load carrier, should be as large as possible to maximise stowage and equipment space, and should be as heavy as regulations and the constraints imposed by transportation allow. The use of add-on principles for armour and stowage will optimise flexibility for growth.

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Air transportation: The (Essential) requirement for C130 Hercules Transportability restricts height to around 2.5m, and width effectively to around 2.7-2.8m. Axle limit on the C130 is 5,900 kg, indicating limits of around 17,700 kg for a 6x6 vehicle, and 23,600 kg for an 8x8 vehicle. However, the overarching limit on vehicle mass = 17237kg, therefore only the latter is of significance. ie. Mass in airtransportable condition (not battleready) must be less than17,237 kg.

Highway movement- axle loading/ total vehicle mass: The (Essential) requirement to meet NZ "Land Transport Safety Authority- Heavy Motor Vehicle Safety Inspection Guide" normally restricts vehicle width to 2.5m (Appendix C refers), though a permanent exemption should be readily achieved and, most importantly, restricts vehicle weight according to axle numbers/type and wheelbase:

LTSA Fact Sheet 13 (Mar-97) limits axle loads to 6,000 kg on a steered axle, 5,400 kg on twin steered axles, and 6,000 kg on a non-steered axle.

Max GVW is: 6x6, two axles steered: 16,800kg
6x6, one axle steered: 18,000kg
8x8, two axles steered: 22,800kg

For a given wheelbase; max sum of axle weights on two or more axles are:

Wheelbase
3.0-3.3m (eg VAB, Pandur , Puma 6x6s) (19,000 kg)
3.3-3.6m (eg LAV II, SB BMR) (20,000 kg)
3.6-4.0m (eg LAV III 8x8, Henschel Fuchs, CG LAV-300) (21,000 kg)
4.0-4.4m (eg SIBMAS) (22,000 kg)
4.4-4.7m (eg BTR 80, Ratel) (23,000 kg)
4.7-5.1m (eg Iveco-OTO Breda Centauro) (24,000 kg)

For any axle loading above this, severe penalties are likely to be imposed by LTSA for road movement. In practice, only the Centauro and Henschel Fuchs would be significantly constrained below design battleweight.

MMP: A function of vehicle mass, number of wheels, tyre size, and tyre pressure/ CTIS.

Trench crossing: Assuming all leading candidates are front engined (ie. BTR 80 would fare well here, but advantage would be outweighed by absence of rear access), largely a function of wheelbase, ie. 8x8s will excel.

Weight, balance, stability (post-mine incident mobility): Largely a function of number of wheels, ie. 8x8s likely to perform better, but 6x6s may be able to adequately extricate themselves.

Protection: Vehicles designed with modular armour protection likely to be more readily updated with the latest armour technologies. Vehicles with a "clean" clutter-free exterior likely to have best detection avoidance performance.

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Carrying capacity (crew & payload): The carrying capacity indicates a vehicle of around 17 tonnes battleready on entering service, growing to 18 tonnes during its life (though a generic breakdown of system mass would be helpful here).

Large ramp/rear door: It is widely accepted that the best, that is quickest and safest, method of access and egress from an IMV is a large rear ramp, ideally including a small door within the ramp as an alternative means of access/egress. The ramp usually offers the quickest means of opening the complete rear compartment for dropping/picking up the infantry section. It also offers, when lowered, a large near-horizontal launch pad, or settling area, so that the infantryman can fully get his bearings before setting off into the battlefield or alternatively can, given the luxury of time, clean boots of the heaviest of mud before mounting the vehicle. The smaller one-man door offers an alternative appropriate if, for example, dropping/picking up only one or two infantrymen, or a passenger or mobile casualty. Only LAV III offers this option OTS, while a number of candidates offer double rear doors.

Reliability/ Availability/ Maintainability: The vehicle should have been developed in an ILS environment.

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6.5 Summary of NZA Armoured Vehicle Contenders

System Option:	Combat mass-kg (as manuf spec)	Combat mass-kg constrained by LTSA on w'base, or on no/type of axles?	Designed in ABCA ILS envir-onment?	C130 trans-portable mass = 17237kg (maybe 2 000kg over this allowed as combat mass)	Width (LTSA allows 2.5m w'out exemption)	Max width (C130 = 2.7-2.8m)	Rear Ramp/ Door?	Contender With C130 Requirement in?	Contender if C130 Requirement is Removed?
Steyr Pandur 6x6	12 500 (A-type stepped hull)	No	Yes	OK	2.500	OK	2 rear doors	No: Inadequate payload & growth	No
SIBMAS 6x6	18 500	Yes, but only to 18,000	No	OK	2.500	OK	Only one small door alongside rear engine	No: non-C130 transportable. Too high to top of turret (2.65) unless a low-roof variant can be offered.	No-poor rear access
Patria 6x6	16 000	No	No?	OK	2.900: would need exemption	No go	2 rear doors	No: non-C130 Transportable. Too wide	**Yes**
GIAT VAB 6x6	16 000	No	No?	OK	2.490	OK	2 rear doors	**Contender? Combat mass marginal for payload & growth?**	**Yes**
Henschel Fuchs 6x6	19 000	Yes, to 16 800	Yes?	OK	2.980: would need exemption	No go	2-part rear door		**Yes**
Reunert Ratel 6x6	18 500	Yes, but Only to 18 000	No?	OK	2.516	OK	Only one small door alongside rear	C130 transport-able height marginal (2.5m+?)	No- poor rear access

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System Option:	Combat mass-kg (as manuf spec)	Combat mass-kg constrained by LTSA on w'base, or on no/type of axles?	Designed in ABCA ILS envir-onment?	C130 trans-portable mass = 17237kg (maybe 2 000kg over this allowed as combat mass)	Width (LTSA allows 2.5m w'out exemption)	Max width (C130 = 2.7-2.8m)	Rear Ramp/ Door?	Contender With C130 Requirement in?	Contender if C130 Requirement is Removed?
							engine		
Iveco-OTO Breda Centauro 8x8	25 000	Yes, to 22 800	No?	Would always be o'weight	3.050: Would need exemption & may need escort	No go	Single rear door	No: non-C130 transportable. Too wide.	No? Too large/ Heavy?
BTR 80 8x8	13 600	No	No	OK	2.900: Would need exempt-ion	No go	No rear doors-Excluded by rear engine	No: non-C130 transportable. Too wide. Rear engine-no rear access. Inadequate payload & growth. May also anticipate poor ILS/ Support?	No, No ILS/ rear door or ramp excludes it? Rear engine
BTR 90 8x8	17 000	No	No	OK	3.200: Would need exemption & may need escort.	No go	No rear doors-excluded by rear engine	No: non-C130 transportable. Too wide. Rear engine-no rear access. Inadequate payload & growth. May also anticipate poor ILS/ Support?	No? No ILS/ rear door or ramp excludes it? Rear engine
LAV III 8x8	17 000	No	Yes	OK	2.660: Would need minor exemption	OK	Rear ramp/ door	**Leading contender- C130 transportable & built up to C130 limits.**	**Yes**
LAV III 6x6	12 500	No	Yes	OK	2.66: Would need minor	OK	Rear ramp/	Inadequate payload & growth	No

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System Option:	Combat mass-kg (as manuf spec)	Combat mass-kg constrained by LTSA on w'base, or on no/type of axles?	Designed in ABCA ILS envir-onment?	C130 trans-portable mass = 17237kg (maybe 2 000kg over this allowed as combat mass)	Width (LTSA allows 2.5m w'out exemption)	Max width (C130 = 2.7-2.8m)	Rear Ramp/ Door?	Contender With C130 Requirement in?	Contender if C130 Requirement is Removed?
					exemption		Door		
Puma 6x6	7500	No	No	C130 Could carry 2!	2.300	OK	Single rear door	No: most inadequate Payload & growth	No
Santa Barbara BMR 6x6	14 000	No	No	OK	2.500	OK	Single rear door	No: Inadequate payload & growth.	No
Cadillac-Gage LAV-300 6x6	14 969	No	No	OK	2.540	OK	Single large rear ramp/ door	No: Inadequate Payload & growth?.	No
Panhard VCR-2 8x8	15 000	No	No	OK	2.700: Would need minor exemption	OK	"Could have" single large rear ramp/ door?	Potentially the 2nd best contender, but as of 8 July Panhard has declared it will not participate and VCR is out of production.	No
ASLAV	13 000?	No	No	OK	2.499	OK	Two rear	Inadequate payload	No

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System Option:	Combat mass-kg (as manuf spec)	Combat mass-kg constrained by LTSA on w'base, or on no/type of axles?	Designed in ABCA ILS environment?	C130 transportable mass = 17237kg (maybe 2 000kg over this allowed as combat mass)	Width (LTSA allows 2.5m w'out exemption)	Max width (C130 = 2.7-2.8m)	Rear Ramp/ Door?	Contender With C130 Requirement in?	Contender if C130 Requirement is Removed?
							doors	& growth.	
LAV II 8x8	12 792	No	No	OK	2.499		Two rear doors	Inadequate payload & growth.	No
TOTAL CANDIDATES								2?	4?

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6.6 Leading contenders.

By likely preference against the User Requirement, and referring to the table in Section 6.5, the leading contenders are:

- **GM Canada LAV III** (leading contender- concern would be getting best price).
- **GIAT VAB 6x6** (Probably the next best of the 6x6 options, but combat mass marginal for payload and growth @ 16,000kg and little development life).

6.7 How could a wider competition be generated?

With reference to the table in Section 6.5, and specifically the last column in the table, removal of the (currently "Essential") requirement for C130 Transportability, would allow entry of two further competitors, the Henschel Fuchs and the Patria which are both large 6x6 contenders.

6.8 Recommendation

The LAV III, as a Prime Equipment, is technically way ahead of the competition. Assurances on Price and Support Package are needed. NZ should solicit the assistance of the Canadian Government in negotiating a best-value extension of the current Canadian Army order placed upon GM, in conjunction with a separately-negotiated contract for Support. Agreement in principle to proceed with this course of action will be required from CGS, and the Minister of Defence, and it will be necessary to draft a paper for this approval.

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7. Conclusions from the IV&V

The IV&V Detailed Review of the URD and RFT Documentation has been particularly valuable. The original URD/RFT structure was generally very good, being based upon a document used by an ABCA partner, with the DIDs being based upon those from a concurrent NZ Defence programme. The URD is therefore broadly to ABCA standard, but a large number of changes have been proposed by HVR-CSL, and largely embodied, to specifically reflect the NZA requirements. Requirements were, and remain, written as a mixture of physical and functional requirements, which is appropriate to the anticipated off-the-shelf buy.

The Review of Fundamental Documentation revealed that there were some requirements in the FDP which remained valid and which had not been flowed down to the URD. These were actioned. The main finding of the Review of the LTSA Regulations was that an informal procedure had already been put in place by Project Manager Armoured Vehicle Project regarding early involvement of LTSA, and his nominated vehicle test authority, in the Acquisition Process to ensure a smooth transition on to New Zealand roads.

The Review by meetings with key Army/ MoD staff, and visits to key units, was particularly useful, and a number of important recommendations resulted. A new merged NZMR (New Zealand Mounted Rifles) organisation, embodying 1st & 2nd Regiments (1RNZMR and 2RNZMR), essentially an Infantry organisation with strong Firepower Support and, later, with introduction of the LOV (Light Operational Vehicle), a reconnaissance capability, is awaiting only ratification by CGS (Maj Gen Dodson) for the merger to be widely communicated, with the CO's well prepared for the merger.

There is wide concurrence that the AV will be an IMV, with the FSV protecting IMVs when the latter are moving. If FSV encounters non-anti-armour, then it may be more aggressive (eg some Peacekeeping roles). The AV will facilitate motorised, rather than mechanised (tracked) infantry. The FSV turret should be digitised, with commanders and gunners capability, and TI and II, well integrated.

The AV Programme represents the Army's biggest equipment overhaul since World War 2, and the programme is likely to be the largest factor to determine the performance of the NZA for the next 20 years. It is important that the vehicle is at the start of its life in the market, rather than near the end (eg LAV 3 vs LAV 2), and that the vehicle has been developed in an ILS environment, so that operating, support, and growth benefits are received (eg high MTBF). Interoperability with ABCA countries is important (even if NZ is in a collaborative force with Eastern European countries, the ethos, support and re- supply chains are very different).

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There is a widespread belief in the Support Organisation that facilities and equipment for Support and Training cannot be identified until the Prime Equipment is known. This blatantly is not true, and much generic work can take place; putting in place working groups and detailing outline requirements (eg delivery schedules). There will be centralised Command of embedded support and facilities, at a base level for the Units, with the base level being supplemented by mobile "top-up" or "surge capacity" resources as required. There will be an Annual Directive on Support policy, then a monthly-updated Master Activity Schedule, which forewarns of upcoming exercises and other workload peaks, and allocates priorities.

Infrastructure. In view of the fact that NZA Camps are not secure, secure or guarded garaging facilities will be essential. The main weapon (cannon) will be left in FSV overnight and, if IMVs have overhead weapon station, their 0.5 inch weapon will, similarly, be left in place. Radio and crypto security is also a major consideration, as are laser equipments. Infrastructure needs are not yet defined, and only in part are they portrayed in Development Plans for those Camps affected by the AV acquisition.

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8. Recommendations

All recommendations made in this IV&V report have already been communicated verbally or in written form to members of the Armoured Vehicle Project team. This report should be used as a cross check to ensure that all recommended actions have been considered and incorporated where necessary.

There is an urgent need, in parallel with the tender process, to identify all infrastructure needs, set requirements into Development Plans for Linton, Burnham, Waiouru and Trentham Camps, and involve contractors for civil engineering works at the earliest opportunity.

A point of concern was the format of RFT Part 6 "General Conditions of Contract". This mixes management, commercial and technical aspects of the tendering process. A change to correct this is probably too fundamental at this late stage, though the HVR-CSL-produced RFT hierarchical structure should help the tenderer navigate through the RFT. However, if the AV RFT is to be used as a basis for the LOV Programme, the three Part 6 categories should be segregated, and better cross-referencing into Part 6 made in other parts of the RFT.

Organisationally, there is an immediate need for formalisation of a high level AV Master Transition Plan for introduction of the AV into service, along with sub-plans for individual Units/sites. The decision on where the first AVs are to be introduced into service (Trentham or Burnham) should be made as soon as possible to facilitate the planning process.

The requirement for new operational skills should be assessed, along with new maintenance trades. Recruitment needs to be commenced now and preparatory training plans implemented. HVR-CSL recommended that tenderers should be given further background on the current contractual arrangements for depot level support.

The Army/MoD proposal that the UR should reflect IMVs with no turret "fitted for but not with" capability should be ratified with CGS, then communicated clearly throughout the organisation.

It is recommended that proposals for simulation within the AV Programme should be expanded in the UR. Such simulation must be integrated with the overall Army Simulation concept & proposals for simulation centres at lead units.

The two-tranche approach to acquisition leaves flexibility to change requirements for the second tranche. This could be useful in the event that the shape of UN operations changes significantly but, more importantly, it gives time for OA and "Battle Lab" work to decide direction in all "Growth" issues. The opportunities for early OA work, feeding data into OA when the winning contender is chosen, and Battle Lab work when the first Company of vehicles arrives, should be grasped.

It is recommended that the RFT Hierarchical Structure provided be considered as a tool for assessment of tenders. If the elements of the structure are weighted by operational importance, and used in conjunction with the price breakdown from the tenderer, it will be possible for MoD to make value judgements on optional/desirable capability.

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Late in the IV&V process, when potential tenderers had registered their interest, HVR-CSL was asked to take a fundamental look at the Acquisition Process and the Competition. As a result of this assessment, HVR-CSL concluded that LAV III far surpassed other contenders in meeting the NZAV requirement, and that all other contenders had major shortcomings. A recommendation was made that NZ MoD should negotiate Government to Government with the Canadian MoD for an extension of the current LAV III contract, and negotiate a separate contact for support directly with GM Canada.

The IV&V process, tailored to the time available, appears to have been a success. HVR-CSL has offered its services on the LOV Programme, which must enter service in a similar timeframe. Some linking of the Programmes will therefore result in economies, and consistency in methodologies used.

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Annex A RFT Hierarchical Structure

The generation of a hierarchical structure identifies a 'home' for each element of the RFT that is to be considered in the tender document. It is recommended that the hierarchical structure is presented in Part 1 of the RFT with a brief description that the tenderers are to address each 'line item' in their response to the RFT. Failure to do so (especially on 'essential' items) would nullify their tender. The inclusion of such a RFT 'road map' will improve the tenderers comprehension of the package and hence the quality of his submission.

Likewise, when conducting tender assessment against a structured RFT, the MoD can assess each tender in 'like manner', with a clear audit trail; useful should there be some dissatisfaction from a bidder. A hierarchical structure also enables the MoD to conduct a logical marking system in which a merit mark, confidence mark and sensitivity mark can be assigned against each line item.

The hierarchical structure attached has also been used during the IV&V to target the examination and review of the RFT documentation.

It should be recognised that all references in these hierarchical structures were correct at the time of writing. As the URD and RFT were subject to continuous review and edit during the period of the IV&V some references may now be in error.

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REQUEST FOR TENDER



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Documentation	7
Training	8
Contractor Eng. Tech. Services	9
New Zealand Industry Programme	10
Provisioning Conferences	11
Standard of Design etc.	12
Codification	13
Testing and Verification	14
Price	15
Terms of Payment	16
Options	17
Management Procedures	18
Quality Procedures	19
Configuration Management	20
Inspection	21
Subcontractors	22
Qualifications and Use of Personnel	23
Government Furnished Materiel	24
Delivery	25
Acceptance	26
Title and Risk	27
Contractor Representation etc.	28
On-going Support	29
On-site Facilities for Crown Personnel	30
NZ Government Policy Requirements	31
Intellectual Property	32
Software Copyright	33
Packaging, Handling etc.	34
Security	35
Taxes	36
Insurance	37
Indemnities	38
Financial Security	39
Termination and Cancellation	40
Suspension	41
Contract Variation	42
General Provisions	43
Dispute Resolution	44
Annexes	

Specification	A
Contract Deliverables	B
Delivery Schedule	C
Price Schedule	D
Performance Milestones	E
Payment Schedule	E
Government Furnished Matls.	F
Financial Securities	G
Logistic Support Agreement	H
Lifed Items	I
Contract Eng. Tech. Services	J
Nominated Sub-Contractors	K

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PART 2: TENDER EVALUATION CRITERIA

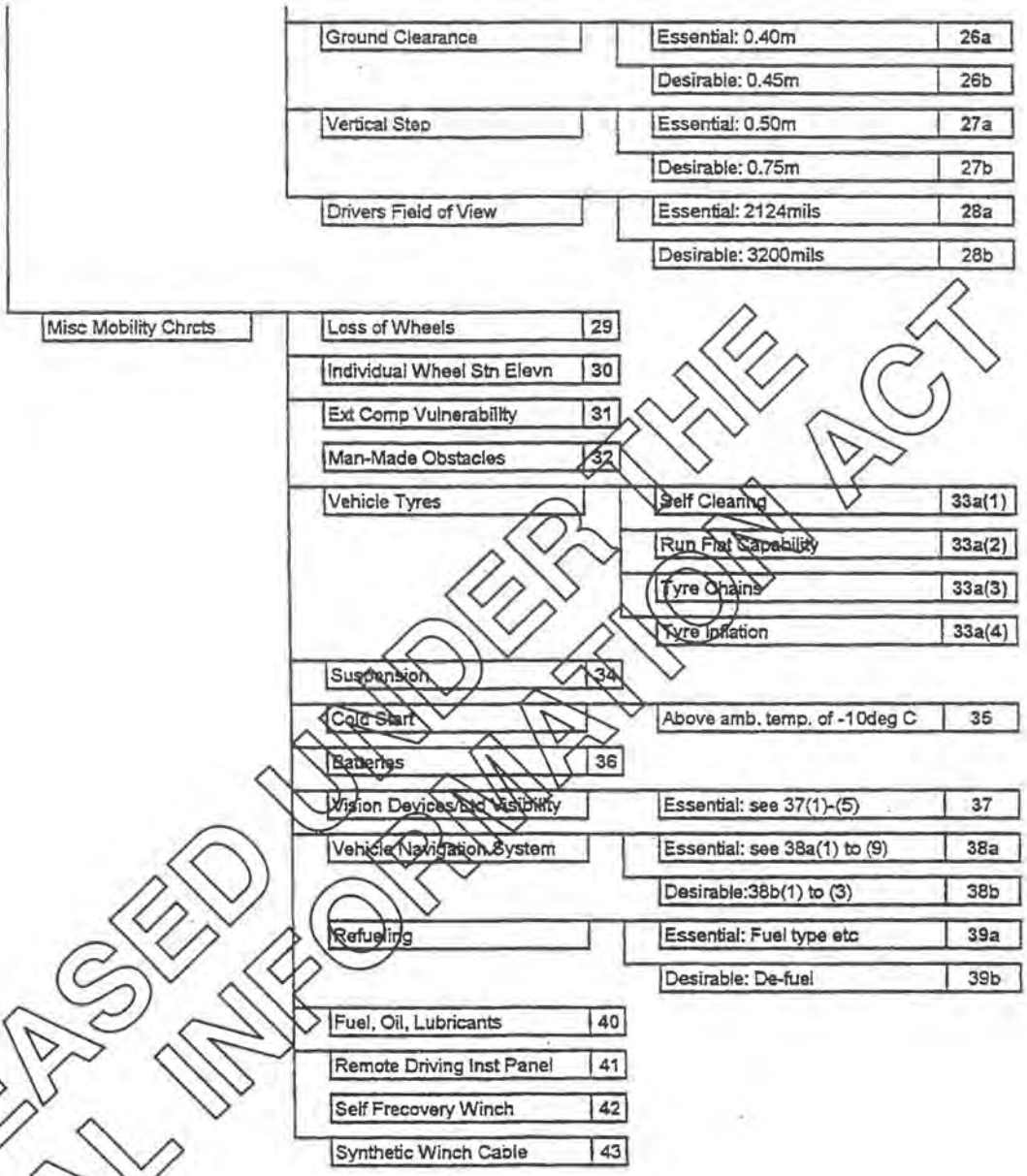
Criteria		
	Risk	2.4.3.1
	Compliance	2.4.3.2
	Operational capability & performance	2.4.3.3
	Characteristics & serviceability	2.4.3.4
	Product support arrangements	2.4.3.5
	Compliance with policies	2.4.3.6
	Proposed Industry Programme	2.4.3.7
	Pricing	
	Price variation	2.4.3.8.1
	Non-compliance	2.4.3.8.2
	Spares	2.4.3.8.3
	Delivery schedule	2.4.3.8.4
	Project management	2.4.3.9
	Experience, technical ability etc	2.4.3.10
	Quality of goods, services etc	2.4.3.11
	Innovation	2.4.3.12
	Meet other requirements of Crown	2.4.3.13
	Security aspects of premises etc	2.4.3.14
	To source and supply spare parts	2.4.3.15
	Facilities and extent of tooling etc	2.4.3.16
	Provision of onsite working parties	2.4.3.17
	Geographical location/political stability	2.4.3.18
	General corporate structure	2.4.3.19
	Priority to Crown's requirements	2.4.3.20
	Ability to work with Crown personnel	2.4.3.21
	Ability to allow ongoing training	2.4.3.22
	Extent of warranties etc	2.4.3.23
	Levels of involvement of subcontractors	2.4.3.24
	Effect of taxation, duties, tariffs etc	2.4.3.25
	Potential longevity of arrangements	2.4.3.26
	Suggestions made by a Tenderer	2.4.3.27

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PART 5.1: ANNEX A

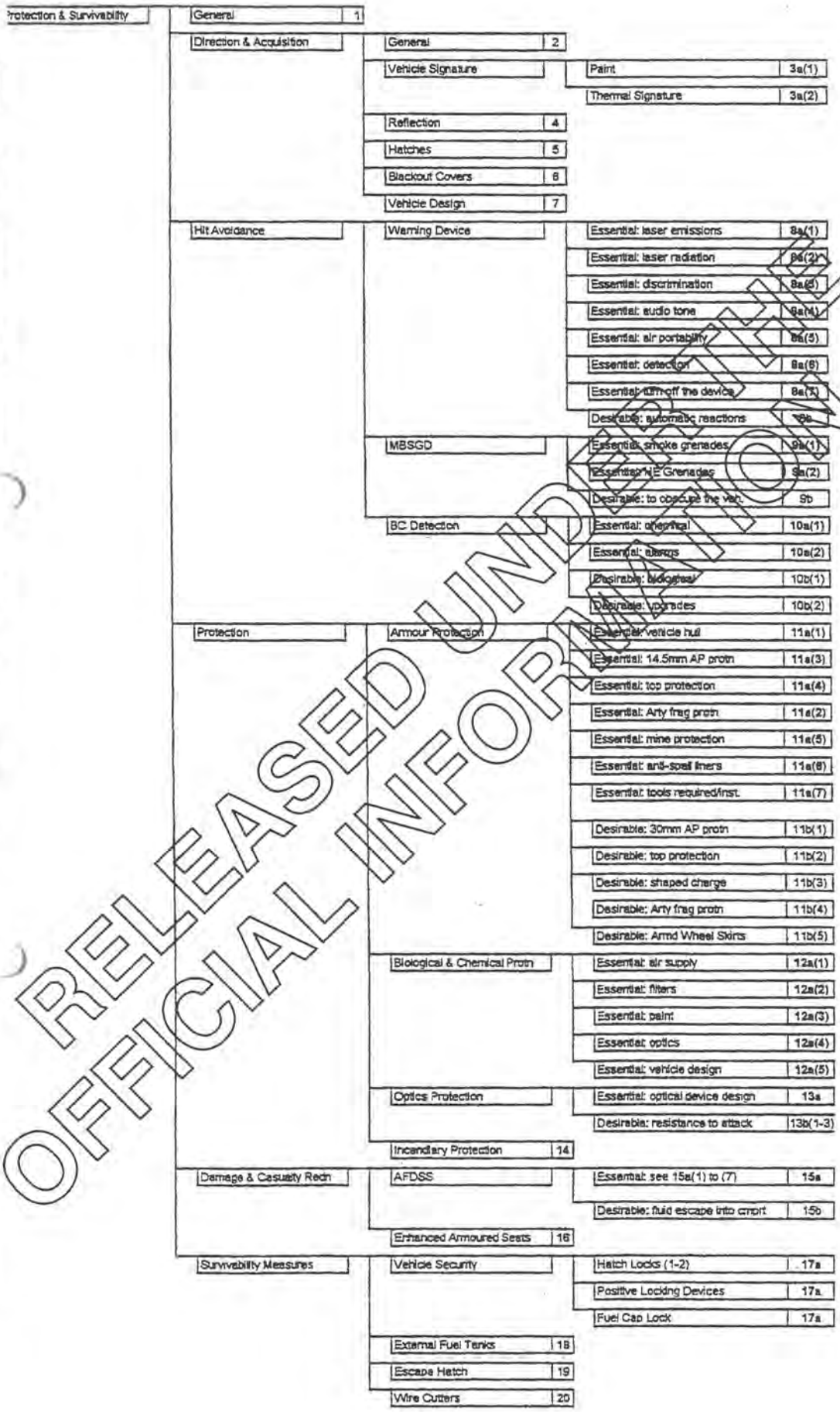
Mobility Characteristics				
	General	1		
	Strategic Mobility		General	2
			Land/Sea Transportation	3
			Air Transportation	4
	Operational Mobility		General	5
			Highway Movement	Essential: Vehicle Axle Weights 6a
				Desirable: Dimensions 6b
			Low Bed Transportation	7
			Speeds	Essential: Cruising 90km/hr 8a
				Desirable: Cruising 100km/hr 8b
			Range	Essential: 450km 9a
				Desirable: 600km 9b
			Exterior Lighting System	10
	Tactical Mobility		General	11
			Sustainable Min Speed	Essential: 5km/hr 12a
				Desirable: 3km/hr 12b
			Sustn Max Cross Speed	Essential: forward 50km/hr 13a(1)
				Essential: reverse 10km/hr 13a(2)
				Desirable: forward 60km/hr 13b(1)
				Desirable: reverse 30km/hr 13b(2)
			Acceleration	Essential: 0 - 40km/hr, 10 sec 14a
				Desirable: 0 - 50km/hr, 10 sec 14b
			Braking	Deceleration 15a
				Hill-hold 15b
			Turning Capability	Not greater than 25m diameter 16
			Mean Max Pressure	Not greater than 450KPa 17a
				Desirable: as low as poss. 17b
			Snow	Minimum requirement 0.5m 18a
				Desirable: 1m deep & chains 18b
			Towing/Recovery	Tow: STANAGs 4019/4101 19a
				Desirable: Tow at 30km/hr 19b
			Slave Starting	24v system (STANAG 4074) 20
			Water Crossing	Shallow Fording 21a(1)
				Deep Fording 21a(2)
			Trench Crossing	Essential: 1.5m at min speed 22a
				Desirable: 2.0m at min speed 22b
			Gradients	Essential: 60% gradient 23a
				Desirable: 70% gradient 23b
			Hill Traverse	Essential: 30% side slope 24a
				Desirable:40% side slope 24b
			Weight, Balance, Stability	As DID ENG 3.6 25

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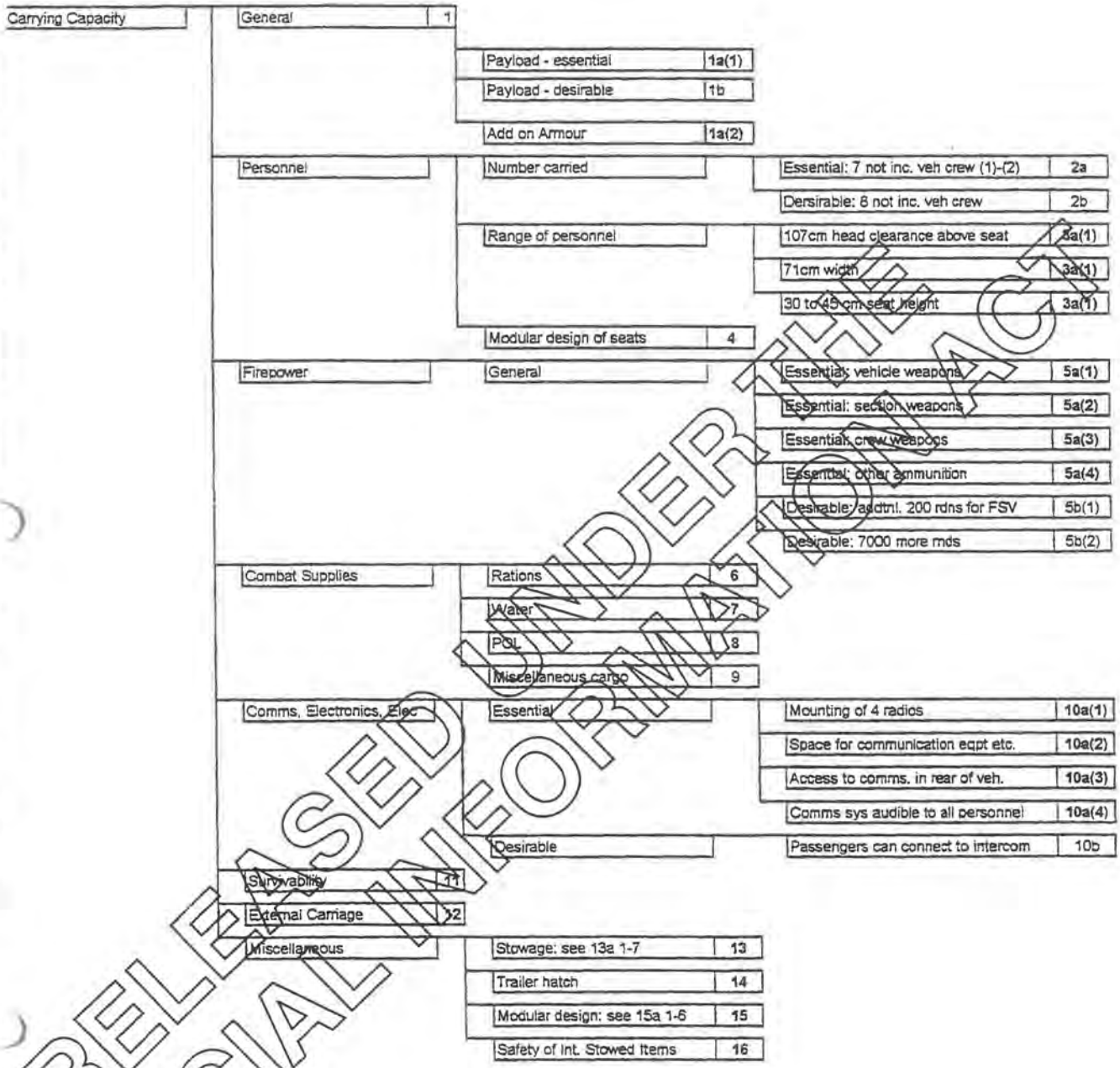
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PART 5.1: ANNEX B



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PART 5.1: ANNEX C

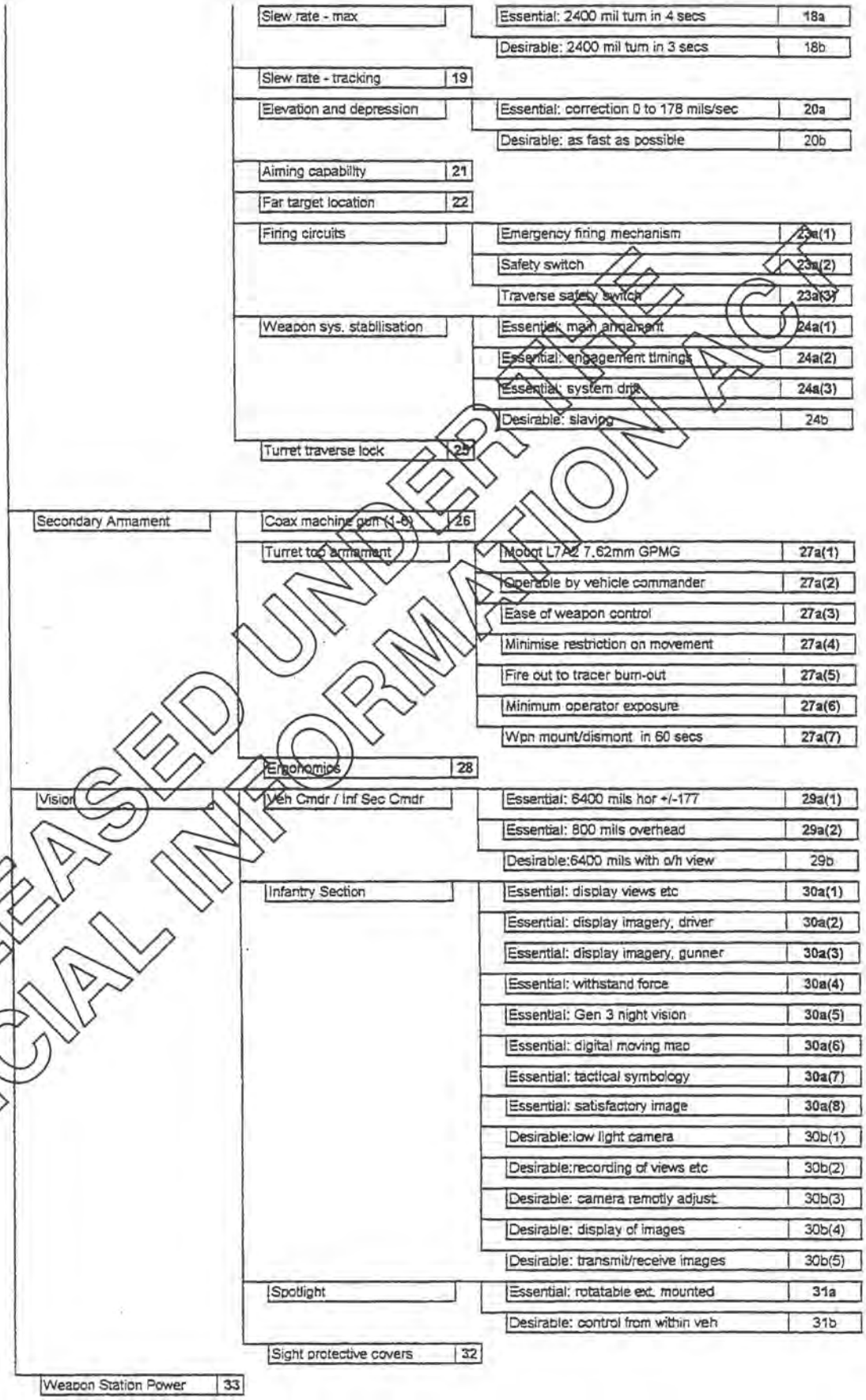


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PART 5.1: ANNEX D

Firepower	General	1	Primary Weapon (1-4)		1a
	Performance defn / condn		Kill		2
			Moving target		3
			Range		4
			First Pull Kill Prob (FPKP)	Defn of FPKP: hit per round	5a(1)
				Defn of FPKP: kill per hit	5a(2)
				Defn of FPKP: opn reliability	5a(3)
				Defn of FPKP: mds in burst	5a(4)
				Ess Rqmnt: stationary silhouette	5b(1)
				Des. Rqmnt: stationary silhouette	5b(1)
				Ess Rqmnt: moving silhouette	5b(2)
				Des. Rqmnt: moving silhouette	5b(2)
			Engagement Time	Essential: 9sec static, 12 secs mvg	6a
				Desirable: time to be minimum poss	6b
			Pull Sequence Duration	Essential: < 3 secs btwn trigger pulls	7a
				Desirable: 1 sec or less	7b
			Re-engagement Time	Essential: 6 sec static, 9 sec mvg trgt	8a
			Ready Kills	Esential: not less than 10	9a
				Desirable: 15 or more	9b
			Stowed Kills	Esential: not less than 60	10a
				Desirable:70 or more	10b
			Re-distribution Time	Esential: no more than 3 min for 10 kills	11a
				Desirable: as brief as possible	11b
			Replenishment Time	Esential: no more than 10 min for 60 kills	12a
				Desirable: no more than 6 min	12b
			Target Acquisition	Essential: daylight sighting	13a(1)(a)
				Essential: night sighting	13a(1)(b)
				Essential: poor visibility	13a(1)(c)
				Essential: field of view	13a(2)
				Essential: dependency	13a(3)
				Desirable	13b
	Fire Control System		Traverse, elevation, firing	Essential: target indication	14a(1)
				Essential: system override	14a(2)
				Essential: target hand over	14a(3)
				Essential: rangefinder (1-15)	14a(4)
				Essential: emergency sight	14a(5)
				Desirable: hunter-killer	14b(1)
				Desirable: ballistic fire control	14b(2)
				Desirable: target comms	14b(3)
				Desirable: barrel wear display	14b(4)
			Ammunition selection		15
			Emergency operation	Essential: < 20% of FPKP, < 50% of reload	16a
				Desirable: no degrading of FPKP & reload	16b
			Traverse	Essential:unlimited full traverse	17a(1)
				Essential: two speed manual	17a(2)
				Desirable: full traverse with max dpm	17b

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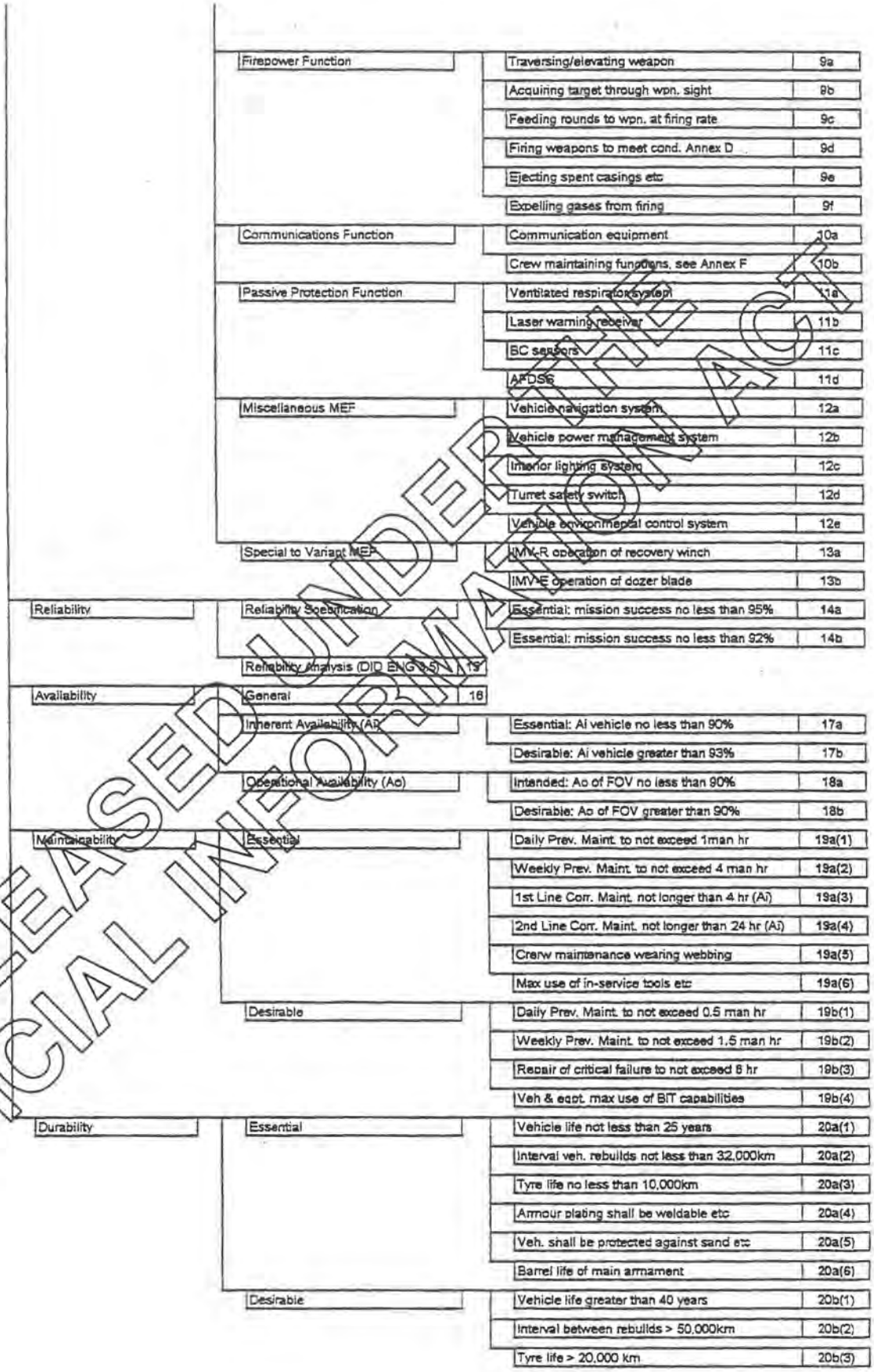


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PART 5.1: ANNEX E

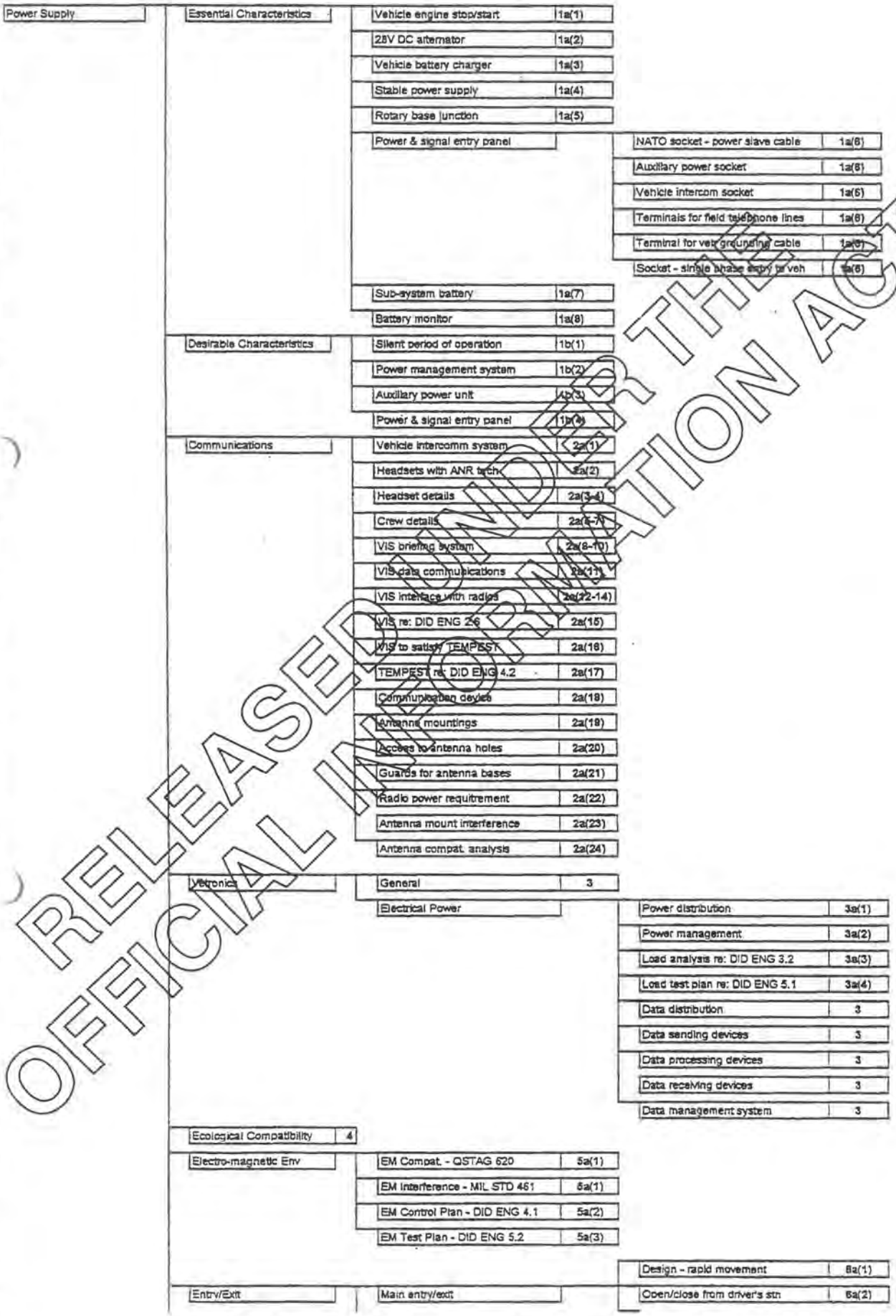
RAM-D	Mission Profile			
		General - see STANAG 4158	1	
		Battlefield day: travelling	100km av speed 80 km/hr (prim/sec rds)	2a(1)
			60km av speed 50 km/hr (prim/sec rds)	2a(2)
			90km on trails/unimproved roads	2a(3)
			60km on medium/cross country roads	2a(4)
			4km reverse (10 km/hr) on med roads	2a(5)
			10km med/cross country, min 50 km/hr	2a(6)
			2km med/cross country, max 5 km/hr	2a(7)
			10km marginal/severe cross country	2a(8)
			3 x shallow ford	2a(9)
			5 x ascend/descend 60% slope (20m)	2a(10)
			Stop/start on 60% slope	2a(11)
			1 x self recovery	2a(12)
			Cont. operation of vision devices	2a(13)
		Battlefield day: engine	17 hours operation (in 7 hours idling)	2b
		Battlefield day: turret systems	Stabilisation during travelling	2c(1)
			System on for at least 20 hours	2c(2)
			Turret bevces/elevation exercised hourly	2c(3)
			Stabilisation during operation	2c(4)
		Battlefield day: weapon sys (FSV)	Main armament - 60 engagments	2d(1)
			Machine gun - 1,000 rounds	2d(2)
			One engagement during silent watch	2d(3)
		Battlefield day: others	Communication/navigation systems	2e
			Silent watch - see Annex F	2f
			BCD equipment	2g
			Boiling vessel etc	2h
		Percentage usage	Vehicle operation of 5,000 km/yr	3a
			Main armnt operation (FSV) 800 rnds/yr	3b
			Co-axial MG(FSV) 4,000 rnds/yr	3c
		Total usage	1 year in 4 operational usage	4a
			240 battlefield days per operational yr	4b
	Failures	Critical Failure	Inability to begin/complete mission	5a
			Degradation of Mission Essential Fn	5b
			Injury or death to personnel	5c
			Failure of equipment	5d
			False warninh of eqpt malfunction	5e
		Failure: inability to function	6	
	Mission Essential Function	General: FMECA re:DID ENG 3.4	7	
		Mobility Function	Operation unaided to -40 deg C	8a
			Manoeuvre forward and in reverse	8b
			Meet speed requirements, battlefield day	8c
			Max speed of 5km/h at GVW for 2km	8d
			Ascend, descend etc on 60% grade	8e
			Controllable by driver	8f
			Water crossing to depth of 1m	8g
			Traverse side slope of a 30% grade	8h
			Cross trench gaps of 1.5 m	8i
			Restart main engine: Annex F	8j
			Perform self recovery using winch	8k
			Maintain limited mobility (mine damage)	8l

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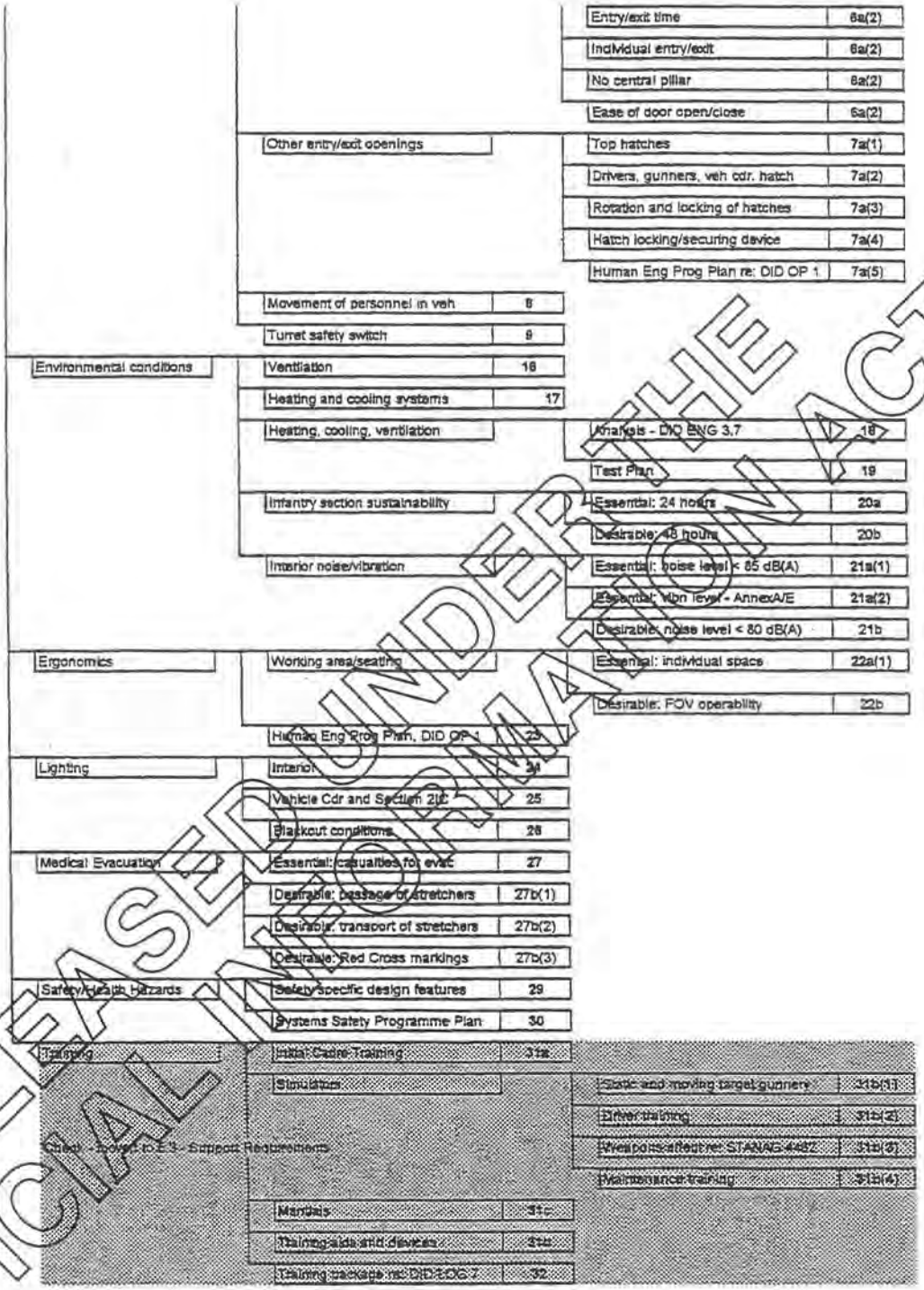


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PART 5.1: ANNEX F



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PART 5.1: ANNEX G

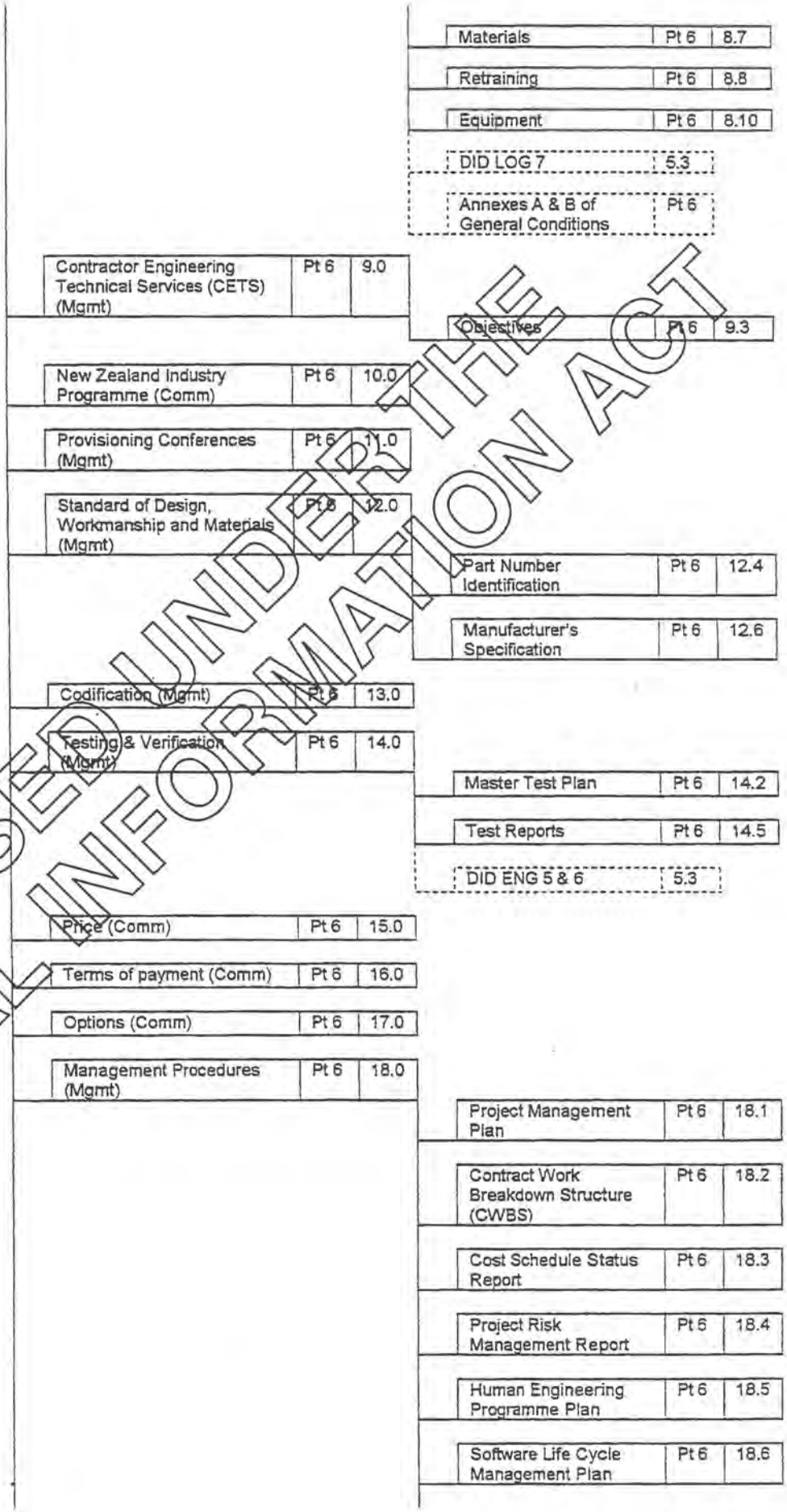
nfantry Mobility Vehicle	General	1			
	Firepower		Primary weapon system	Essential: .50 cal Browning	3a(1)
				Essential: buffered mount system	3a(2)
				Essential: operable by veh cdr	3a(3)
				Essential: ease of weapon cntrol	3a(4)
				Essential: spent round catcher	3a(5)
				Essential: minimise wpn restrictions	3a(6)
				Essential: minimise optr exposure	3a(7)
				Essential: effective fire out	3a(8)
				Essential: mount/dismount, 60 secs	3a(9)
				Desirable: overhead wpn stn	3b
			Secondary weapon system	C9 Lt Subs Wpn or 7.62mm GPMG	4a(1)
				Operable from rear hatches	4a(2)
				Spent round catcher	4a(3)
				Ease of wpn control & servicing	4a(4)
				Minimise wpn restrictions	4a(5)
				Minimum operator exposure	4a(6)
				Effective fire out to tracer burn-out	4a(7)
				Wpn mount/dismount in 60 secs	4a(8)
				Easily removal from vehicle	4a(9)
	Ergonomics	5			
	Vision		Essential: +/- 17° mils in elevation		6a
			Desirable: no restrictn. in elevation		6b
	Antenna		4 access holes on top of vehicle		7a(1)
			Mounting provisions as in Annex F		7a(2)
	IMV-C Variants	8	Mission Equipment	Essential: 3 operator stn seats	8a(1)
				Essential: mounting of map board	8a(2)
				Essential:accessible book shelf	8a(3)
				Essential: adequate lighting	8a(4)
				Essential: desk for each op. Stn	8a(5)
				Essential: stowage for indiv. Wpns	8a(6)
				Essential: installation of 4 radios	8a(7)
				Desirable: modular tent for opns	8b
	IMV-E Variants	9	Mission Equipment	Hydraulically controlled Dozer blade	9a(1)
				Stowage provision for GFM	9a(2)
				Hydraulic Power Take-off	9a(3)
	IMV-R Variants	10	Mission Equipment	Essential: winch 200kN/20m/min	10a(1)
				Essential: hoist > 2,500kg rating	10a(2)
				Essential: stowage e.g recovery eqpt	10a(3)
				Essential: hydraulical anchoring sys.	10a(4)
				Desirable: controlled blade	10b(1)
				Desirable: remote control operations	10b(2)

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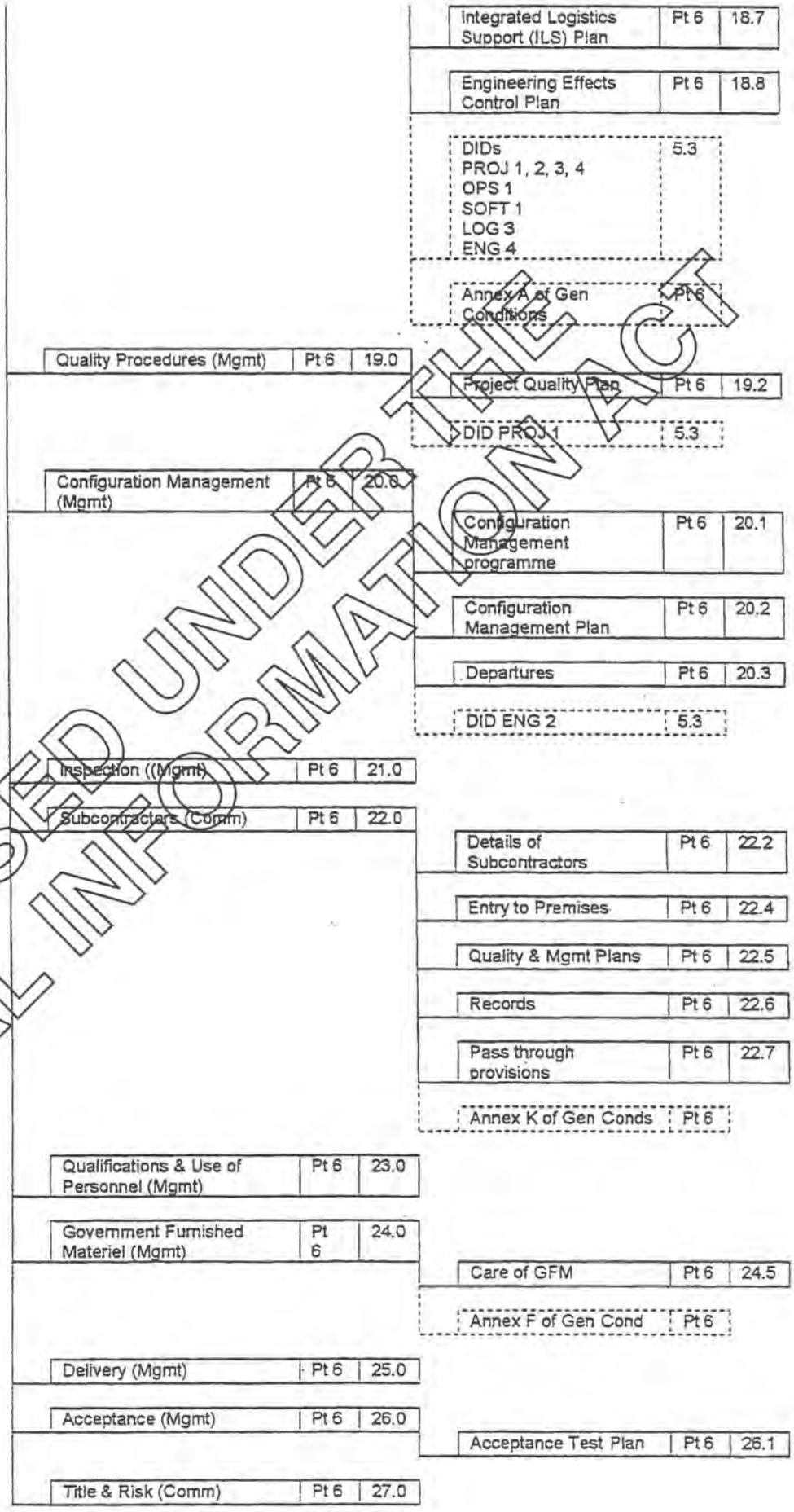
General Conditions of Contract

Level 2:			Level 3:			Level 4:		
General Conditions of Contract	Pt 6	Pp 1-61						
			Construction of Contract (Tech & Comm)	Pt 6	1.0			
						Definitions	Pt 6	1.1
						Interpretation	Pt 6	1.2
						Annexes A, B, C, D, E, J of Gen Cond of Contract	Pt 6	
						DIDs ENG 2, 3, 4, 5, 6 PROJ 4, 5 LOG 3, 4, 5, 6 OP 1 SOFT 1, 2	5.3	
			Conditions (Comm)	Pt 6	2.0			
			Contract Scope (Comm)	Pt 6	3.0			
			Contractor to Supply and Integrate Equipment (Tech)	Pt 6	4.0			
			Support Equipment (Tech)	Pt 6	5.0			
						Annex B of Gen Cond of Contract	Pt 6	
			Spares (Tech)	Pt 6	6.0			
						Annex B of Gen Cond of Contract	Pt 6	
			Documentation (Tech)	Pt 6	7.0			
						Publications	Pt 6	7.2
						Technical Data Package	Pt 6	7.3
						Software Documentation package	Pt 6	7.4
						Configuration Management Package	Pt 6	7.5
						Spares and Equipment Data Package	Pt 6	7.6
						Engineering Analyses	Pt 6	7.7
						Work Task Analyses	Pt 6	7.8
						Reports	Pt 6	7.9
						All DIDs	5.3	
			Training (Mgmt)	Pt 6	8.0			
						Timing & Location	Pt 6	8.3/ 8.6

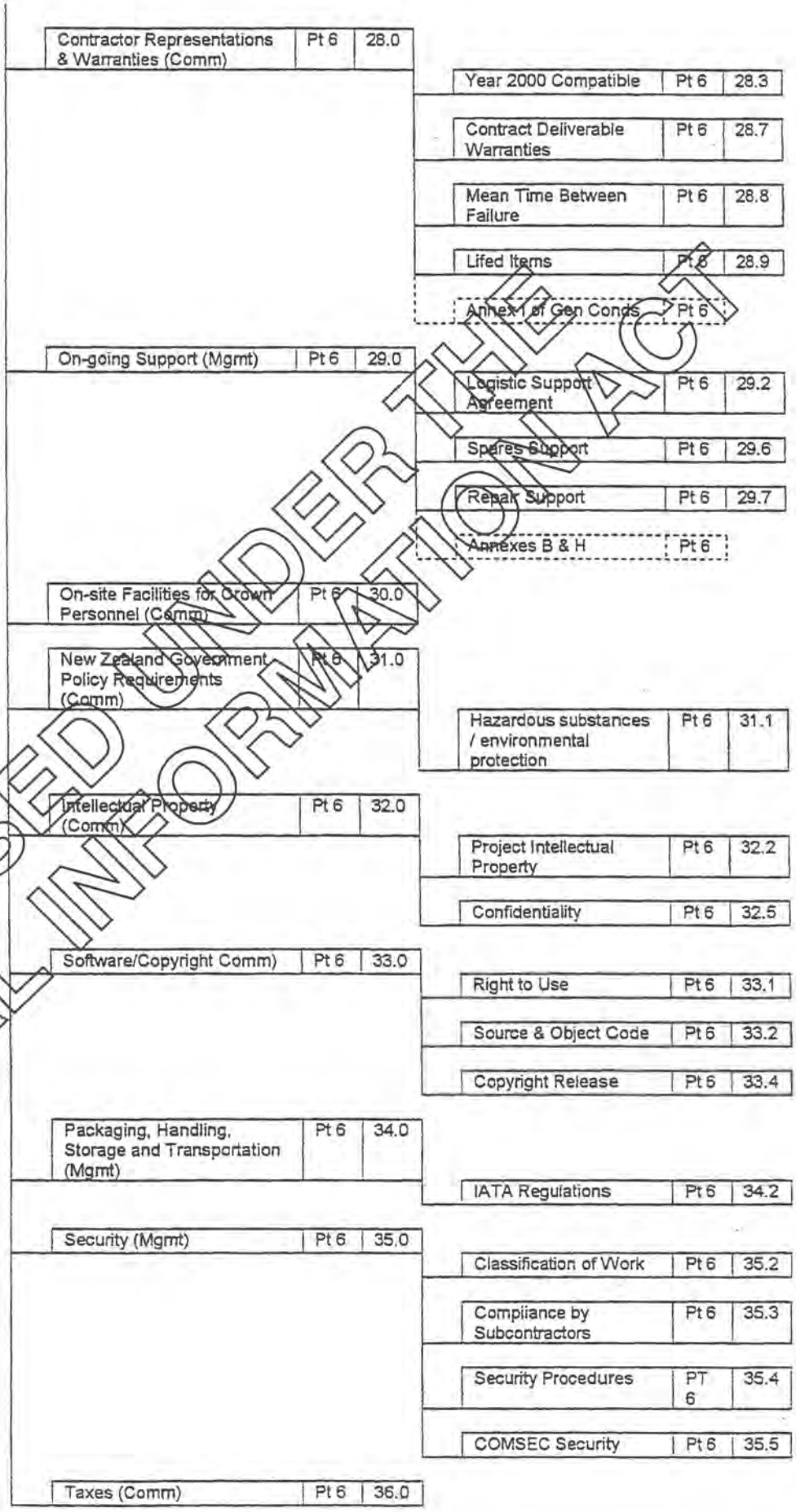
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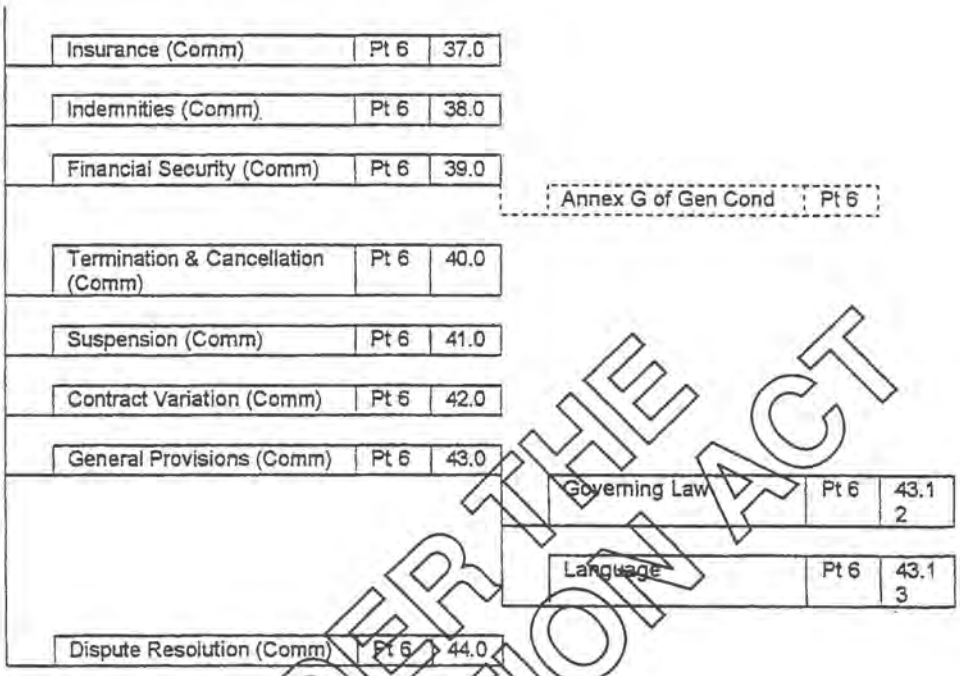
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Annex B Revised Pricing Schedule (Annex F to Rules of Tender)

The recommend changes to Annex F (part only) are provided. It should be noted that all references to URD paragraph numbers were correct at the time of review.

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		PRICE SCHEDULE-EQUIPMENT	OPTION 1			OPTION 2		
Item	URD Ref.	Item Description	Qty	Unit Price (Currency)	Total Price (Currency)	Qty	Unit Price (Currency)	Total Price (Currency)
		Fire Support Vehicle (FSV)	24			24		
1	Pt 5.1, 2	Chassis FSV Variant as per UR						
2	Pt 5.1, 8a	Power Pack (options)						
3	Pt 5.1, A35	Suspension						
4	Pt 5.1, A10	Exterior lighting system						
5	Pt 5.1, A19	Tow rope						
6	Pt 5.1, A20	Slave Starting System						
7	Pt 5.1, A34	Vehicle Tyres (Run flat)						
8	Pt 5.1, A34(4)	Tyre Inflation System						
9	Pt 5.1, A39	Vehicle navigation system						
10	Pt 5.1, A38a	Driver Viewing Aid						
11	Pt 5.1, A38a	Commander Viewing Aid						
12	Pt 5.1, A43	Self recovery winch						
13	Pt 5.1, B3a	Paint						
14	Pt 5.1, B8	Laser Warning System						
15	Pt 5.1, B9	MBSGD						
16	Pt 5.1, B10	BC Detection						
17	Pt 5.1, B12	BC Protection						
18	Pt 5.1, B11	Fitments for add on armour kits						
19	Pt 5.1, B11a(6)	Anti spall liners						
20	Pt 5.1, B15	AFDSS						
21	Pt 5.1, B16	Crew enhanced armoured seats						
22	Pt 5.1, B16	Passenger enhanced armoured seats						
23	Pt 5.1, B20	Wire Cutters						
24	Pt 5.1, C10	Provision for 4 radios (GFM)						
25	Pt 5.1, C16	Trailer hitch						
26	Pt 5.1, D1	2 man turret with cannon						
27	Pt 5.1, D14 / D13	Fire Control / Target Acquisition System						
28	Pt 5.1, D24	Weapon Stabilisation						
29	Pt 5.1, D26	Coax Machine Gun						
30	Pt 5.1, D27	Turret top armament						
31	Pt 5.1, D30a	Infantry section vision display						
32	Pt 5.1, D31	Spot light						
33	Pt 5.1, D32	Sight protective covers						
34	Pt 5.1, F3	Vehicle Intercommunication system						

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		PRICE SCHEDULE-EQUIPMENT	OPTION 1			OPTION 2		
Item	URD Ref.	Item Description	Qty	Unit Price (Currency)	Total Price (Currency)	Qty	Unit Price (Currency)	Total Price (Currency)
35	Pt 5.1, P3b	Active noise reduction headsets						
36	Pt 5.1, F5	Vehonics						
37	Pt 5.1, F17	Heating and cooling system						
38		Miscellaneous/ other items						
39		Test & Commission vehicle						
		Sub-Total (ESV)						

Note 1: All sub-system costs are to include associated installation, integration and testing costs.

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	PRICE SCHEDULE-EQUIPMENT		OPTION 1			OPTION 2		
Item	URD Ref.	Item Description	Qty	Unit Price (Currency)	Total Price (Currency)	Qty	Unit Price (Currency)	Total Price (Currency)
		Armour Protection						
40	Pt 5.1, B11	Add-on Chassis Armour as per UR	67			67		
41	Pt 5.1, B11	Armoured Wheel Skirts	12			67		
42	Pt 5.1, B11	Add-on Turret Armour	12			12		
		Sub-Total						
		Gunnery Simulator	1			1		
43	Pt 5.1, F31	Simulator as per UR						
44	Pt 5.1, F31	Support Equipment						
45	Pt 5.1, F31	Spares						
		Sub-Total						
		Driver / Navigation Simulator	1			1		
46	Pt 5.1, F31	Simulator as per UR						
47	Pt 5.1, F31	Support Equipment						
48	Pt 5.1, F31	Spares						
		Sub-Total						
		ILS Requirements						
	Pt 5.2, 2.1	Initial Spares						
	Pt 5.2, 4.3	STTE						
	Pt 5.1, F31	Publications						
	Pt 5.1, F31	Training Aids						
		Contract Engineering Technical Services						
		On-Site Facilities for Crown Personnel.						
		Miscellaneous / Other Items						
				TOTAL PRICE			**TOTAL PRICE**	

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SERVICES

Item	Item Description	Unit Price (Currency)	Total Price (Currency)
1	Non-Recurring [1]		
2	Contract Data [2]		
3	Training Services		
4	Licences & Data Rights		
		TOTAL	

Notes:

1. The total cost of all non-recurring engineering and software development is to be declared.
2. Price to provide Contract deliverable data as specified in part 5 section 3 of the RFT
3. In order to meet foreign Government security or export requirements, the Crown may have to purchase some materiel (equipment or information) on behalf of the contractor and deliver it as GFM. Tenderers shall identify and cost separately equipment that falls into this category.
   (this last note does not appear to be included in the tables)

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Annex C Proposed URD Changes Resulting from Detailed Review of Section 5.1 - User Requirement

Main Body of URD

UR Ref:	Query or proposed change:
*M2	M2 states that IMV will be fitted for-but-not-with turrets. M8 states an intention to upgrade the (FSV) weapon . If the upgrade is to, say, 30 or 35mm cannon, such an upgrade will almost certainly require a replacement (larger) turret with a larger race ring diameter. Depending upon anticipated weapon upgrade timeframe the NZ MoD should possibly consider (discuss): (i) Specifying the larger aperture in the roof of all FSV & IMV (ii) Fitting a larger turret from the outset, even if initially fitted with the 25mm weapon (eg the Swiss AIFV 2000 (tracked) requirement demands a 30mm turret- 3 options for which are currently on trial. Allied to taking one of the above possible routes, the infantry section compartment should then be designed around the larger aperture or turret, thus obviating redesign of this compartment, or design compromises, at a later date. **(It was suggested that trying to second-guess the future would incur risk, and extra cost. It is more likely that, if a larger weapon was required, then new FSVs would be purchased (with larger turret), with original FSVs being relegated to lesser duties –NFA. 25/6: IB having 2nd thoughts about the value of this)**
***M2	For "The majority of vehicles procured....." read "All vehicles procured...."
*M3	Although this statement is clear, if a reader dives straight into the Annexes the message is missed. It may be better to add FSV at the start of each Annex header? **(Agreed)**
**M7c	Annex C 2a talks of "an infantry section consisting of 7 soldiers not including the vehicle crew". There is some ambiguity in the crew terminology later in the UR. Suggest the following is added here: "The crew consists of vehicle crew plus infantry section. The vehicle crew consists of commander, driver, and (for FSV) gunner. The infantry section consists of 7 soldiers including infantry section commander." **(Agreed?- though TR has some concern that NZ may not always differentiate between "crew" & "vehicle crew").**

Annex A:	"Mobility Characteristics"
URD Ref:	Query or proposed change:
A5.	C130 transportation will impose an overall height constraint of around 2.5m. This may be problematic particularly for FSV Variant. These constraints normally vary slightly from nation to nation due to different arrangements for protection of aircraft floor structure and tie-down. A physical constraints drawing could be included with Annex A? (Other C130 constraints should not be problematic). **(NX agreed to consider, so that tenderer could overlay outline of his vehicle on NZ C130 outline)**
A6.	NZ Land Transport Safety Authority Regs on vehicle & axle weight limitations, and regs on vehicle dimensions are required to validate (requested 2/6). **(TR got copy 21-Jun-99, & to do separate review to see if any ramifications on UR-primarily- can regs be summarised in a few lines (or specific parts referenced?)**

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A7.	NZ regs on restrictions on height imposed by road & rail bridges are required to validate (requested 2/6). **(See A6 comment, but nothing forthcoming on limitations during transport by rail).**
A10d.	(Ref "blackout drive and marker lights"): Depending upon the waveband utilised by driver & commander night vision devices (for driving/ command of driving, use of a convoy light outside the visible band but within the II (near IR) band may be preferable & less detectable by opposing forces. Note: Gen 3 II to be used at all stations (RefA38)- are these NVG only??. **(There may be fleet-wide implications here-eg truck drivers, without NVG, are required to see convoy lights- NFA)**
A12.	Need check min speed (E5/D3 km/hr) is achievable OTS). **(Out of Canadian Req- would accept whatever "crawler" speed is offered-NFA)**
A13a(2)	Any requirement for reverse driving aids (beyond mirrors) eg as fitted to trucks/buses? **(Commander on ground/in turret/in top of vehicle would be adequate; no other provision justified-NFA)**
A15.	Need check NZ civil vehicle regs, especially braking effy, steering & axle loads, and that performance is available OTS. Also check figs given in URD are available OTS. **(See separate review later)**
A16.	Need check wall-to-wall turning circle of 25m is possible OTS. **(NZ believes all leading candidates would have turning circle well inside this limit-NFA)**
A17.	Need check MMP (MI Std 810 for fine grained soils) is "not greater than 450 KPa" (check Orgorkiwicz paper). **(TR to check back in UK)**
A18b(2).	Suggest "wheel chains to……" could read "wheel chains or composite track to……" **(TR expressed concern on how track tension was to be maintained under differential suspension travel. NZ has no wish to get involved in development. If tracks come onto market, then NZ may consider buying-NFA)**
A 19a.	Suggest "……a suitable tow rope" should read "……a suitable tow rope normally stowed under cover" (to avoid unnecessary contamination, snagging on undergrowth & signature-aggravating "clutter"). **(Accepted)**
*A21a(2)	In deep fording, a common operational problem is reduction in available tractive effort due to flotation upthrust, and consequential reduction in the weight on the wheels. This can mean that exit from a ford is difficult, and self-recovery may be necessary. This probably does not warrant a change in the requirement, but rather an operational acknowledgement of a likely occurrence-ie crossing of water gaps may take considerably longer than anticipated. **(It was agreed that this was an operational ground appreciation problem and, if problems were experienced, then self-recovery capability would be used)-NFA**
*A22	Missing **(Agreed/ had been corrected in 21/6 issue)**
A28.	Need check a 40% side slope can be negotiated for 30 minutes OTS. **(straight from Canadian requirement-NFA)**
A29.	Need check E4m/D0m dead ground is available OTS!! & how? Plus relocate to Annex D (see Annex D "General" note). **(Accepted. TR said he could not envisage any engineering solution to this desirable requirement. Desirable was therefore changed to 3m)**
A31.	Need check wheel stations can be raised to hull OTS. **(It was agreed that, although LAV3 Hydropneumatic suspension may, longer term, be able to offer such an**

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	active capability, the current words would permit a conventional jacking/winching approach-NFA)
A32.	It is suggested that specifying size (& spacing?) of trees be avoided but, if this is a requirement, the Prime Contractor should be expected to demonstrate this performance against a notional obstacle. **(NZ does not wish to spec an obstacle. NZ has no obstacle course on which to trial this, and therefore DIDs should demand a demonstration)**
A33.	Note: wire cutters should be specified for turret or superstructure-mounted crew as well as driver. **(Agreed "exposed crew members" is OK-NFA)**
A34a(2)	Check customer is aware of run-flat liquid option! **(Yes, & it has been trialled by NZ)**
A38b.	Add: "The availability of on-board compressed air as potential means of clearing dry debris & drying and, in conjunction with an air knife as a means of wiping, should be considered. Plus relocate to Annex D (see Annex D "General" note). **(NZ wish to avoid a special development-NFA)**
A39a(7)	"commander in the back of the vehicle" should read "infantry section commander"? **(Agreed)**
A39a(9)	Check Nav performance is achievable OTS (ie with GPS). **(Believe NZ has specified current I/S performance, but Kelvin Hawley is to double-check with Dr Stewart)**
A39b(3)	Check Nav performance is achievable OTS (without GPS). **(As above)**
A40	May need add a requirement to be able to use the fuel system on-board pumps to (part) de-fuel the vehicle for air transportation (safety & weight reasons)? **(NZ averse to a development-soldier can always siphon fuel if required-NFA)**
*A44	It is not known whether such synthetic winch cables are of proven reliability and robustness? **(NZ says are in-service in Canada, well-proven-NFA)**
Annex B:	**"Protection & Survivability Characteristics"**
URD Ref:	**Query or proposed change:**
B4a	Suggest "……degradation of performance;……" should read "degradation of performance and should incorporate outward-facing windows undercut at an angle of approximately 7.5 degrees relative to vehicle horizontal datum to avoid upward reflection of sunlight;….."? **(Accepted)**
B7	Suggest "acoustic signature" should read "acoustic and seismic signatures"? (Note: the use of hydro-pneumatic suspension and low pressure (large section) tyres should reduce seismic signatures-used by some mine threats). **(Accepted)**
B8a(1)	0.532 is neodymium (x2), while 1.54 is Neodymium (Raman Shifted). Ruby, NdYAG and most other commonly deployed lasers, are therefore within this range. CO2, however, is not. **(To be included as a desirable)**
B8a(2)	"…with respect to the cannon (FSV)," should read "….with respect to the cannon (FSV) or centreline of the vehicle hull (other variants)." (To acknowledge that the vehicle commander requires this information in all variants). **(Accepted)**

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B8a(4)	A philosophical issue: Generally, information should only be given to the crew if, based upon that information, some decision can be made or some action taken. Only commander, FSV Gunner (desirably) and driver can take evasive action. An audio tone to the remaining crew may serve only to alarm them to no avail? **(Accepted-warning for vehicle crew only)**
B9a(2)	To avoid any ambiguity "an angle of launch" should read "an elevation angle of launch". Maximum range, if this is the aim of specifying such a launch angle, does depend to a small extent upon ammunition format, but will normally be attained at an elevation angle of launch of nearer to 40 degrees. **(It was agreed that only range was important & that angle would be taken out)** Should "The 50% lethality zone shall be 30m" read "The lethality zone shall be 30m from point of detonation"? **(NZ thinking of Wegmann mortar, but meaning of lethality zone yet to be clarified)**
B9b	"It is also desirable that the MBSGD fire thermal obscurant." appears to duplicate the requirement of B9a(1)? **(No-one is essential & one is desirable-NFA)**
B10a	"manually or automatically" should read "in manual and automatic modes" to avoid the risk of the tenderer supplying either/or. **(Accepted)**
B11.	"....apply to the hull and turret of the vehicle." could read "……apply to the protection offered by basic hull and turret structures of the vehicle". (Note- internal ancillary equipment (eg cast aluminium electrical boxes) may actually generate secondary projectiles or fragmentation effects). **(Accepted)**
B11a	"....,eventual retrofits……" could read "……,upgrades……"? **(Accepted)**
B11a(6)	UK experience suggests a stand-off of 10-20mm for the spall liner, if the space is available, enhances performance. **(Accepted-will say "fitted to" rather than "bonded to" to leave options open)**
B11a(8)	"installed/removed" is ambiguous, and should probably read "Installation or removal of the complete add-on armour system, by the crew, must be possible within six hours" **(Accepted)**
B11a(9)	New B11a(9)? Much of AV documentation refers to Armoured Skirts over the rear 4 wheels & rear lower hull, but this appears to have dropped out of the UR. **(Accepted-23/6- KH re-introducing the requirement, but as "desirable", so could be dropped if budgetary constraints demand it)**
B11b(1)	(Typo): believe "2A42 cannon" should read "A242 cannon"? **(Accepted)**

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*B11b(2)	Not available OTS? (TR needs discuss face-to-face). Most solutions in development will have serious implications ie damage to vision devices, claims on real estate, obscuration of line-of-sight. There is a solution which avoids many of these problems, and which could possibly be developed in the timeframe. Whichever route is taken (even if top protection is reduced to the status of growth potential) it is important that the likely structural loads of the armour system on the basic structures are known and accommodated in the structural design. Current day OTS structures are unlikely to be adequate. **(NZ understands all options are in development & therefore purchase unlikely, but tenders will inform NZ of what might become available in the future. Therefore NFA)**
B11b(3)	Suggest side protection at 60 degrees obliquity is possible OTS. Side protection at smaller angles of obliquity, and rear protection, may not be achievable within weight constraints. **(As above)**
B11b(5)	Similar requirement to B14. Should be amalgamated with B14 under heading "Incendiary, Flame & Fire Protection". **(one is essential, and one desirable, but agreed to amalgamate)**
*** B11b(5) (new)	Add: "Armoured wheel skirts are to be purchased as original equipment (Desirable), to a single design suitable for all variants. The number of vehicle sets required is specified in RFT Part 6, Annex F (Pricing Schedule). The skirts will not normally be fitted for Peacetime use. This number is less than the number of vehicles being purchased, but is consistent with the maximum number of vehicles likely to be operationally deployed at one time."
B12	Regenerative BC filtration systems may become available within the programme timescale. There would be considerable logistic savings (no replaceable filter elements), but increased power requirement of perhaps around 25kW. A more detailed investigation may be warranted, unless NZ deems logistic commonality with other vehicles in the fleet to be the priority. **(Off-The-Shelf buy is priority-NFA)**
	NZ should consider whether a "collective + individual protection system" is required. ie a collective system, with the whole of the crew compartment being protected, means that the crew retains unrestricted freedom of movement inside the vehicle providing BC sealing is not breached. Once the sealing is breached, then individual protection will be required. Cost implications are minimal- only slightly more complicated air distribution ducting is required. **(Accepted-but new words required)**
B12a(1)	"Justification" refers to "a nuclear accident", but no nuclear protection is specified (need discuss with NZ). **(Agreed to take out)**
B12a(4)	The NBC mask is specified (at A38).Therefore, this is really a requirement on the optical (Vision) systems and should therefore appear in Annex D under "Vision". See Annex D "General" comment **(Agreed)**
B13 (all)	Relocate to Annex D (see Annex D "General" note). **(B13 will stay where it is, but both will cross-refer)**
B14	Note at B11b(5) should be amalgamated with this. **(Agreed)**

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B15 General	Depending upon the drive system used for the main engine cooling group fans, and upon the location of the fans (ie within or without the engine compartment), it is common for the AFDSS to include an interface to close down the cooling fans in event of AFDSS activation, so that extinguishing the agent is not ejected from the engine compartment before the fire has been extinguished, and equipment been allowed to cool adequately. **(Agreed, but words required from KH)**
B15a(1)	"be equipped with a separately activated AFDSS" should maybe read "be equipped with separately activated AFDSS sensors and circuits"? **(Agreed)**
B15a(2)	It may be necessary to specify the function of the commanders override more fully to avoid ambiguity. **(Agreed to do this in Justification")**
B15a(6)	"...carried externally, under armour" could perhaps read "...carried under armour, but external to the crew compartment....."? **(Agreed)** ".....stowed externally;....." could read "...stowed external to the crew compartment....."? **(Agreed)** "...vented containers..." could read "...containers which will vent to atmosphere in the event of pressure build-up..."? **(Agreed, but words required- as suggested plus- "due to detonation, without compromising armoured protection levels")** Appears not to have been finished? **("and" leads to a(7)-NFA)**
B16	In view of the proliferation of the mine threat in modern (often peacekeeping) roles, it may be worth adding a specific requirement for a collapsible seat support structure- the structure must provide shock absorption capability in the event of attack by mine. (Unlike MBT/Recce- in most IMV-type vehicles, space will be available to justify such a fitment). **(NZ wish to avoid development, but will accept what is offered by the best tender-NFA)**
B17a&b	To avoid duplication of requirements, transfer all a&b to Annex F 13. **(Agreed to leave as is, but cross-refer)**
B18	Delete? Duplicates requirement @ B15a(6). **(Agreed)**
B19	Add: "This escape hatch must not be in the floor of the hull". Justification: It has been proven beyond doubt that such a location for the hatch, in the event of mine attack, will often result in the hatch being blown through into the crew compartment". **(Agreed)**
Annex C:	**"Carrying Capacity"**
UBD Ref:	**Query or proposed change:**
C1	Should "infantry section consisting of 7 soldiers" read "infantry section consisting of 7 soldiers (including infantry commander)" to avoid ambiguity? **(Agreed)**
***C2 (new)	".....should be capable of carrying a total payload ....." should read ".....should be capable of carrying, under all operational conditions, a total payload....."
***C2a (new)	"Crew, infantry section and their total equipment....." Should read "Crew, infantry section, combat supplies (but excluding fuel carried in regular fuel tanks), personal and vehicle equipment.....".
***C2a (new)	The Canadian breakdown appears not to include the Vehicle Commander within the crew, but a total of 3000 kg still appears reasonable.

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***C3 (new)	"....the weight of any add-on armour." Should read ".....add-on armour including fixings."
C2(a)(old)	"....section consisting of 7 soldiers not including the vehicle crew." should read "....section, consisting of 7 soldiers, plus vehicle crew (ie driver and vehicle commander)." **(NZ- probably not differentiating between "crew" and "vehicle crew"- check revised words)**
C2b	Justification: List could include "negotiator, politician and press". **(Detail-NFA)**
C3	Add: "For infantry section seating only, where 3-4 soldiers are sitting shoulder-to-shoulder,- the tenderer may provide a statistically-based justification for reducing shoulder-width availability (note for NZ- the chances of getting 3 or 4-off 95th percentile male soldiers sitting shoulder-to-shoulder is remote. However, there is a case for letting this stand to allow for growth in population dimensions over the life of the vehicle- discussion needed. There may be implications on C3b? **(Sentiment agreed, but NZ wishes to exclude vehicles designed for "small" crewmen- in general they will be too small in a number of areas-NFA)**
C4	"...open position.." needs clarification. **("raised" is no better, "open" means under-seat stowage open-NFA)** Add new: "The modular seat design shall provide for ready access to personal weapons- location on the front end of the armrest should be considered"? **(NZ is using Steyrs & will accept whatever stowage is offered-NFA)**
**C6a	M7c requires "....all the personal and vehicle equipment required by the crew....on the battlefield for a minimum period of 48 hours.." C6a requires "24 hours of in-service field rations for the section..." Presumably "24 hours" here should read "48 hours", and "the section" should read "the crew"? **(Personal kit carries 24 hours rations, therefore stowage only requires 24 hours more rations to give 48 hours total-NFA)**
** (mod) C7	In view of climatic extreme (A1) strongly suggest a permanent-fitted stainless steel (to avoid tainting) tank with cooling provision is specified, in addition to jerry cans (for emergency dismounted use). Australian experience (to "Bushranger" requirement) is valuable here-anecdote of section getting to end of long drive, being dehydrated, but with (plastic, uncooled) water container remaining full!! **(NZ Industry has good cooler technology, therefore NZ likely to retrofit own solution-NFA)**
**	Justification for C7 (at Justification 5) suggests 4 litres per person per day. For a 48 hour mission and 10 man crew, therefore, the water requirement is 4 x 10 x 2 = 80 litres (not 2 x 20). **(Agreed)**
*C9	In view of requirements like C9 (1 cum of miscellaneous stowage), C10b, C12, etc, a "Space Allocation Budget", to be produced by the Prime Contractor early in the programme, may be justifiable? **(Do not anticipate any space problems- particularly in IMV variants where there is no turret. SAB not justified-NFA)**
C10	What is TMCS Project (radios?). Provision of this data will require careful planning & management. **(Dimensions of radios now included at 21/6 issue UR)**
C12	"....stowage provision.." should read ".....undercover stowage provision..". Justification- cam system is ideally stowed in bins, to avoid snagging on undergrowth and avoid external "clutter"- which can aggravate signature. Access into bin should be from roof of vehicle, so that net can be quickly dropped into place over vehicle.

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and need not be lifted into position. **(KH to seek "Tanky" comments, but suspect that, if dedicated stowage is provided, it would get used for other gear, with cam net still ending up externally stowed)**

C14 Justification: It is important that a detailed stowage list is generated before RFT is issued. However, if this is not possible, a stowage volume per person could be estimated from current/recent experience? **(There is no integrated Infantry/Armoured Corps User yet, therefore would get 2 different answers, both of which would be wrong by ISD-NFA)**

Suggest all equipment listed should be stored under cover- otherwise BC contamination, snagging, aggravation of signature are all risks. **(Agreed?)**

*C15 Missing **(corrected at 21/6 issue)**

C16 Is "ramp" mentioned elsewhere? **(Yes, now at F12- 21/6 issue)**

Annex D: **"Firepower Characteristics"**

URD Ref: **Query or proposed change:**

General Annex D should be renamed "Firepower and Vision Characteristics" so that the following can be re-located to Annex D:

- Annex B: 12a(4) ("Optics")- this is actually a requirement on the Vision system, and not appropriate to BC Protection (its current location).
- Annex A: 29 ("Drivers Field of View")- this is appropriate to Mobility, but is the only remaining "vision" requirement to be so, therefore could equally well go to Annex D.
- Annex A: 38 ("Vision Devices/Limited Visibility")- not all appropriate to "Mobility".

(Agreed to use cross-referencing)

*D1 D1 should make clear that the FSV carries a firepower system with cannon, fire control system, plus secondary armament in a 2-man turret. IMV Firepower requirements are specified at Annex G. **(Agreed)**

As a principle; where OTS (off-the-shelf) equipment is proposed, it should be allowed that verification of detailed performance is by documented evidence of previous trials. Major savings in trials costs should accrue as a result. **(Agreed DIDs should do this)**

Anti-combat helicopter capability may require high rate of fire (300-400 rnds/min) or autotracker (eg Raytheon 3D autotracker). May need leave open for tenderers to propose which route is chosen (like current Swiss IFV requirement). **(Agreed that anti-helicopter capability should be for "mission-abort")**

QSTAG 410 "AFV Damage Assessment Values"- get copy?

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*D2	Above D2 , but beneath "PERFORMANCE DEFINITIONS AND CONDITIONS" there should be a subheading "FSV 25mm STABILISED AUTOMATIC CANNON SYSTEM" or similar. (Note this sub-heading covers all requirements down to the end of D13, wherein Fire Control System requirements commence. **(Agreed, but take out "25mm", as it could be larger)**
*D5a(3)	"the system" should read "the firepower system" ? This will, nevertheless require some careful definition if a meaningful number is to be given to 'Pr'. **(Agreed to add "firepower", but only superficial assessment can be managed by NZ- no more detailed work can be contemplated)** 'Pk' will not actually be a constant, but rather a function dependant upon the position of the round in the burst; ie 'Pk' will rise as the burst progresses. Guidance on the form of this function may be available, if refinement is thought worthwhile. **(Agreed that Pk can only be considered to be a constant-NFA)** The use of a FPKP formula is justified, particularly in the LAV field where ceramic & HHS (high hardness steel) armour systems proliferate. These materials often lack toughness and are therefore susceptible to multiple hits in the same region. **(observation only- NFA)**
*D5b	Justification 'c': It should be made clear that these numbers are only illustrative- the FPKP figure, in particular, may vary depending upon the weapon/target overmatch. Suggest "...results in..." should read "may result in...." **(Agreed)**
*D11	The definition of Re-distribution time could be improved ? How about: ".....to re-distribute sufficient rounds from stowed kills to re-establish the ready kills capability (from a position of zero stowed kills)"? **(Agreed)**
*D13	The illuminance given (under "Justification") is at 0.4-1um (ie visible and near IR)- the waveband more normally used for II equipments. Need verify performance of COTS (off-the-shelf) TI. At night 3-5um and 8-14um are the most useful wavebands for TI equipments, 8-14 offering ultimate DRI performance, though often with a cost penalty if cooled elements are used. **(Agreed- KH to seek illuminance figures for the 2 bands from Trentham. 23/6- KH/TR agreed that tenderer should be asked to state the DRI performance along with the mid-IR or Far-IR (as appropriate) solar radiation levels assumed for the performance given).**
*D13a(1)c	Under "Justification 5c(2)": should "...temperature difference...." read "...apparent temperature difference..." so that variations in emissivity of target bodies are ignored and, rather, thermal contrast measurable at the sight is specified? **(Agreed)**
*D14	(Actually Sub-heading above) should read "FSV FIRE CONTROL SYSTEM"? **(Agreed)**
*D14a(4)(i)	Lasers are "eyesafe" only beyond a certain range. Need ask tenderer for eyesafe range. **(Agreed)**
*D14a(5)	Emergency Sight requirement could be incorporated within expanded Annex D, now including "Vision", but the sole purpose of the emergency sight is weapon aiming or "Fire Control", so this current position is probably valid. **(Agreed to cross-reference)**
*D14b(1)	To avoid ambiguity ".....align the gun to his sight automatically and fire immediately after the first target is destroyed." Could read "....align the gun to the commanders sight automatically and fire at the second target immediately after the first target is destroyed."? **(Agreed)**

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*D14b(3)	"forward observers computer" does not appear as a requirement anywhere, though this clause implies provision of an input to one? **(OFC will not be procured under AV programme, so output only- RS232 or similar is only requirement-NFA)** Believe "....computation of target location for engagement by indirect fire assets in FSVs designated as forward observer vehicles." Should read "....computation of target location, in FSVs designated as forward observer vehicles, for engagement by indirect fire assets."? Even so; would FSVs (rather than IMVs) be allocated forward observer duties?? **(FO could be FSV, LOV (Light Operational Vehicle) or dismounted- NFA)**
*D15	This is normal for, say, 25mm Chain Gun. However, contemporary linkless feed systems may use single feed with interlaced ammunition natures. Such a system demands more sophisticated intelligence or sensing of rounds but can reduce delays in switching between natures, and can reduce "crowding" of feeds around the breech area. **(Agreed to take "dual" out)**
*D16a	Does "primary vehicle power" include turret batteries? If so, this clause may exclude Chain Gun options? Chain Gun manual feed is understood to limit gun performance to single shot. FPKP is therefore much reduced. Manual turret drives will, similarly, much increase engagement times. **(Agreed to say "Using turret batteries only……..."** Does "reload" refer to Re-distribution, Replenishment or some other activity? (needs defining as other terms?). **(Reload is OK, cannot better describe without assuming a weapon configuration- NFA)**
*D17a(1)	"...unlimited full traverse..." should read "....unlimited (n x 6400 mils) full traverse..."? **(Agreed)**
*D17b	Add: "an electronic interlock with the firing circuit should prevent firing in any obstructed part of the field of fire"? **(Agreed to write "If any part of the nominal field of fire is obstructed by any part of the vehicle, then an electronic interlock with the firing circuit should prevent firing in this part of the field of fire" (or similar))**
*D18a	"....azimuth four seconds." Should read "....azimuth within four seconds." **(Agreed)**
*D20a	Ranges should be "at least" the figures given? **(Agreed)**

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*D24a(1) Slaving of sighting systems to weapon can give poor firepower performance. If, over severe terrain, the stabilisation system has difficulty making the weapon synchronise with the target, then the sights may also lose lock on the target. If, on the other hand, the weapon is slaved to the sights, then the sights, having components with low inertia, can be highly responsiveness and, even if the weapon loses synchronisation with the target, the sights will not, and the target can rapidly be re-acquired with the weapon. See comment below on D24b. **(Agreed a preference can be stated, but 25mm Bushmaster, as fitted in Delco LAV turret, must not be excluded by the requirement- TR to check on 25mm stab method. Or, has sight-led stab come in with move to all-electric drives for 25mm turret? 25/6: TR spoke to Bruce Trowbridge (Tel 001-805-961-5352)- 25mm Turrets currently in-service are a mixture of electro-hydraulic and all-electric turret drives. Latest turrets being built for Canada, plus what would be offered for a new sale, are all-electric drives. All 25mm turrets, including latest offering, are weapon-stabilised with both sights mechanically slaved to the weapon. TR suggests to NZ that either/or be specified, but with preference stated for stab sight/slaved weapon system. Low inertia of 25mm weapon may mean that there would never be a loss-of-track instance? (Note, for reference: GM Canada Bill Pettipas (Dir of Marketing & Defence) is Tel 001-519-453-5112)**

*D24a(2) This duplicates earlier requirements, and should be re-written: "The stabilisation system must facilitate FPKP and Engagement performance specified at Annex D parts 5b and 6 respectively". **(Agreed)**

*D24b This requirement is in conflict with D24a(1) and, in fact, should be the preferred method of stabilisation (see comment at D24a(1). **(One is desirable & one essential- see above at D24a(1))**

***D24b After "Desirable" add: "(this requirement, by preference, replaces that at 24a(1))".

*D26 (Sub sub-heading) should read "FSV Coax Machine Gun" **(Agreed)**

*D29 Heading should read "FSV & IMV-Vehicle Commander and Infantry Section Commander". **(FSV agreed, IMV is Annex G)**

*D30a Add new (8) in order that viewing angle problems inherent in some flat screen technologies are avoided: "In order to ensure that all soldiers in the infantry section have a satisfactory image, the display technology must offer an effective viewing angle of at least +/-1000 mils in the horizontal plane, and +/- 500mils in the vertical plane". **(Agreed, but take numbers out)**

*D31a "....figure 11 target...." Requires further explanation (a reference specification?). **(Agreed to take "fig 11" out)**

*D33 Believe "...interrupts traverse power to the weapon system when...." Should read ".....interrupts turret traverse power and weapon system power (including power to the firing circuit) when..." ? **(NZ wishes to avoid development, and will take what comes-NFA**

Add note: "See also requirements for turret safety switch system at Annex F 15." **(Agreed to cross-reference)**

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Annex E:	**"RAM-D Characteristics"**
URD Ref:	**Query or proposed change:**
E1	There is no introduction to explain the purpose and context of the various parts of Annex E (ie RAMD) plus the related DIDs. **(23/6: "Scotty" agreed to draft this introduction & review (28/6?))** **Elements to put into context are:** • **Battlefield Day** • **Failures (definitions)** (see comment @ E5&6) • **Peacetime usage** • **Total usage** • **MEF (Mission Essential Function)** • **Current RAMD DIDs:** • **DID No ENG-3.5 (Reliability Analysis)** • **DID No ENG-5.5 (Maintainability Demonstration Plan)** Note on Peacetime Usage & Total Usage: (presumably these will allow the Prime Contractor to estimate spares requirements, utilisation of maintenance facilities and, if necessary, life cycle cost.) Notes on the trials and demonstrations which a Prime Contractor may be expected to conduct: **FPPT** (Function & Performance Trials)- primarily to verify that the requirements of Annexes A-D, F, and G have been met. **(This to be done by compliance matrix only?)** **RGT** (Reliability Growth Trials)- primarily to verify that, for any developmental equipment, then during the development phase of the programme, reliability growth is taking place so that, on entering service, the specified levels of Basic Reliability and Mission Reliability will be met. Careful monitoring of Basic and Mission Reliability failures is essential, with BIT (Built-In-Test) being advisable in some areas. Where the vehicle is largely OTS, with known reliability, then RGT may take part at subsystem level, with real data being used to verify low-confidence parts of an overall Reliability Model, with Reliability Allocations down to replaceable/repairable sub-assembly level as required by DID No ENG-3.5). **ISRD** (In-Service Reliability Demonstration): Once the vehicles have formally entered service, the ISRD is to confirm that specified Basic & Mission Reliability levels are actually being achieved by In-Service vehicles. Again, careful monitoring of failures is essential. **(23/6 meeting with "Scotty": It is envisaged that ISRD (or assessment-ISRA?) will be run by NZA, with no Prime Contractor involvement-therefore no DID is required, but TR needs discuss with the PM the possibility of withholding a final payment)**
*E2	Some systems where reliability problems could arise are not being exercised in the BFD: eg cold start, CTIS, remote DIP, hatches (open/close/lock), external lighting. Some of these are also MEF (Mission Essential Function)-eg wheel station elevation, self recovery (particularly synthetic winch cable?), AFDSS. **(Need discuss with "Scotty", but probably supplement as-is with reference to reliability modelling for equipment that has not been specifically exercised?)**
*E4	Total usage: comment as above. **(As above)**
E5&6	5 should cover definition of "Failure"

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6 should cover definition of "Critical Failure" & "Relevant Failure" (latter is not attributable to misuse or accident)-use 6 to cover both to avoid re-numbering.
(23/6: Agreed with "Scotty" & KH)

*E7&8 Mission Essential Function: comment as above. **(As above)**

*E14 Formula for Reliability not legible? **(OK at 21/6 issue)**

Need to define Mission Reliability and Basic Reliability

Need say that Failure Rate = "(MEF) failures/hr"?? **(Need check with "Scotty")**

*E14a(1) "critical failures" are defined in paragraph 5 (not 2). **(It is BFDs that are referred to, therefore reference is correct- NFA)**

*E17 MTBF = Mean Time Between Failures? **(Means all or "basic" failures- Agreed note should be added to clarify)**

*E20 Vehicle rebuild interval is specified as not less than 32 000 km.
E2a says 1 BFD = 336 km
E4b says 240 BFD/ Op yr **(23/6: agreed HVR should propose 90 BFD/Op yr, ie ¼ usage rather than 2/3 usage originally proposed by NZA Colonel (CO1RNZIR?)**
ie 80 640 km/Op yr
E3a says 5000 km/ peacetime yr.
E4a says 1 Op yr in 4 yr
Therefore 4 yr usage = 80 640 + 3 (5000) km
= 95 640 km/ 4 yr period

Therefore, E20 (rebuilds in not less than 32 000 km allows for 3 rebuilds in a 4 year period (HVR suggested that this was excessive, Availability would be badly affected, and further discussion with "Scotty" & KH was required. (Established that 32 000 km is derived from M113 practice-ie M113 rebuild period was extended by NZ from 8000 to 16000 miles, then it was assessed that new wheeled AV should allow twice the overhaul mileage).

(From 23/6 meeting (this needs to be clearly presented in HVR report):
90 BFD/QP yr gives
30 240 km/Op yr
Therefore 4yr usage now = 30 240 + 3(5000) (note-UNIMOG can do 7000km/yr, therefore 5000km/yr peacetime may be OK, particularly if Trg is at Waiouru & need drive from Linton for each TRg session)
= 45 240 km/4 yr period

Therefore E20a(2) (now to be essential 50 000 km/ desirable 75 000 km) allows for a rebuild interval no shorter than 4.42 years.

Annex E (Part 5.1) needs to identify the "RAM Plan" as a requirement, unless it is integrated into the ILS Plan requirement. Either way, there needs to be some reference to the RAM Plan.

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Annex F:	"Miscellaneous Characteristics"
URD Ref:	**Query or proposed change:**
*F1c	Let "....battery charger..." read ".....permanently-fitted battery charger connected to the 230v 50Hz entry terminal on the Power and Signal Entry Panel (Annex F 1f refers) ..."? **(Agreed)**
*F1e	Is the "separate camera mounted on the turret" the same camera as Annex D 30a(1)? The latter is, incidentally, implicitly vehicle (hull) mounted. If this is a different camera, then there is no mention of it in Annex D under "Vision" (ie new D31 required?) **(Agreed to use..."from turret sights & cameras")** It would show foresight if a "for but not with" provision, within the RBJ, was made for a fibre-optic channel located on the rotational axis of the RBJ. There should be minimal if any effect on cost. **(NFA)**
*F2a	To be meaningful, this requirement should really have a detailed mission scenario with knowledge of which systems will be in use. DID Nos ENG-3.2 and ENG-5.1 should be expanded to include electrical load analysis, and test plan respectively, for silent operation. **(Agreed)**
*F3d	"...voice operated (VOX)..." Should read "...voice-activated (VOX)..."? **(Agreed)**
*F3o	".... power requirements for radios be provided." should read "......power supply points for radios be provided."? **(Agreed)**
*F4	Missing **(Agreed- to be corrected)**
*F6b(5)	The list of "mission essential equipment" referred to here is not apparent. **(Agreed to re-word to: "....reduce power to the electrical equipment, giving priority to mission-essential equipment")**
*F6c	RefG is not apparent (at start of main body of document?). **(Is listed at start of Annex F- NFA)**
*F13b	RefI is not apparent. **(As above)**
*F13c	"...(45 degree) position...." could read ".....(45 degree) 'peep' position....."? **(Not used by NZ- NFA)**
*F13e	DID OP-1 is not evident within DIDs (RFT 5.3)? **(It's there and, due to need to rule out small vehicles, must remain-NFA)**
*F15	"....the turret incorporate traverse safety switches...." should read "....the vehicle and turret incorporate turret traverse safety switches...." (on the basis that some of the switches are in the vehicle (hull)). **(Agreed to say "vehicle" (only))** Add note: "See also requirements for weapon system safety switch at Annex D 33." **(Agreed)**
*F20	(Typo only) "...for the section..." should read "...that the section....". **(Agreed)**
*F22a(1)	Delete- this duplicates requirements at Annex C 3. (The remainder of 22 should stay) **(Agreed)**
*F23	See F13e comment. **(NFA)**

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***F24	Add new requirement: "Consideration should be given to adoption of woven fibre-optic lighting technology. This technique is utilised in backlighting of liquid crystal displays, and could conceivably be embodied into the front face of anti-spall liners to provide a flush, non-intrusive, reliable lighting system". **(Initial Army Review suggested the need to avoid development cost was the priority but, subsequently, Col George Rooks agreed this should be inserted)**
*F31&32	All current F31&F32 should appear in RFT 5.2 (Support Requirement), leaving 5.1 for Prime Equipment. **(Agreed)**
*F31	New F31: There is no coverage of Prime Equipment Software Requirements in Annex F. Suggest this should be corrected? **(NFA)**
Annex G:	**"IMV & Variants"**
URD Ref:	**Query or proposed change:**
General	Annex G could be deleted if a column was added throughout the other Annexes to indicate which FOV variants were affected (eg FOV, FSV, IMV, IMV-C, etc)? **(Format would be too difficult now- NFA)**
***G1	M2 states "The majority of vehicles procured will be fitted for but not with turrets.....". This requirement is not expanded elsewhere, and there is a risk that diverse solutions will be tendered which could, at worst, require subsequent fabrication, cutting and machining of hull structure. Add to G1 a statement: "It is essential that all vehicles will be fitted for but not with turrets, ie: For all IMV Variants: • The hull structure shall be configured adequately to accept FSV travelling & firing loads, including the provision of brackets for turret basket guide rollers where these are to be fitted to FSV. • The hull roof plate shall be provided with an aperture suitable for fitment of FSV turret. The periphery of the aperture shall be provided with mounting holes suitable for an FSV race ring. • The aperture shall be closed with a blanking plate fixed, using some or all of the race ring mounting holes, and the interface sealed, using a suitable sealant. • The blanking plate shall carry: * The IMV Primary Weapon Station (Annex G Section 2 refers). * The Vehicle Commanders Vision equipment (Annex G Section 5 refers). * The Vehicle Commanders entry & exit provisions (Annex F Section 13 refers). • The floor area beneath the blanking plate shall be made good consistent with the surrounding floor area. • The FSV Hull Electrical & Electronic Harness shall be fitted, along with the FSV Rotary Base Junction, temporarily locked in position, or an IMV Junction Box which accepts the harness-to-RBJ connectors. Connectors and other junctions exiting the RBJ and not used, by virtue of their turret-function, shall be temporarily capped. The RBJ or IJB shall be protected from physical damage by a temporary floor-mounted cover plate.
*G5	Delete: these requirements should be covered by the modified Annex D 29 **(NFA)**
*G6	Delete: these requirements are covered by Annex F. **(NFA)**
*G11a	Add: "When stowed, the dozer blade shall have minimal effect on vehicle mobility-in particular the requirements for ground clearance and vertical step negotiation."? **(Agreed)**

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*G11c	More common practice is to have a compressed air power takeoff for portable tools- unless, perhaps, NZ has very heavy duty portable tools- need check power required? **(NZA use hydraulic tools- NFA)**
*G13a	Why not use the standard self-recovery winch? (A43-discuss). **(Self-recovery is 8-tonne. Requirement is 20 tonne (Rotzler)-NFA)**
*G13b	The planned primary purposes for the hoist should be stated (power pack changes, etc?) **(Agreed)**

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Annex D Proposed URD Changes Resulting from Detailed Review of Section 5.2 - Support Requirement

URD Ref:	Query or proposed change:
	".....is to have full ILS integration included in its development....." indicates that the agency for NZ Army Equipment Support Agency (correct title?) anticipates significant development work within the programme, while early informal discussions with NZ MoD Acquisition Division suggests an approach closer to an OTS (off-the-shelf) buy. It is important that all agencies have a similar perception ASAP because: If there is an OTS buy, then there may be less ILS integration than the Support Agency expects. If there is full ILS integration, then there may be a requirement for more development work than the Acquisition Division or Funding Agency anticipates.
	Does NZ MoD have a comprehensive definition of "Illustrated complete Equipment Schedules"? In British Army experience, while stowed tools and personal kit were clearly CES, semi-fitted equipment such as periscopes were sometimes vehicle-fitted, and sometimes CES. (If any clarification can be given, this should probably appear in DID LOG-5.8).
	Where, and by whom, will base grade repairs be undertaken? Can this be stated?
	"The plan should ...." should read "The maintenance option plans should...."?
	(typo only) "...through to the vehicles LOT"- delete "to" ?
4.2.5	Refers to "...maximum use of simulators wherever they provide cost-effective training....." Is the intention to allow the tenderer a free hand (where LCC-based justification allows), or do NZ Army Operational & Maintenance Doctrine & Concepts not indicate from the experience of NZ Army, or others, certain preferences for application of simulation? One guide may be the ready adoption of NDI simulation, or that involving minimum development cost for operational & maintenance training??
	(typo?) "6.6.1.2" should read "6.3.1.2"? (3 instances)
7.1.1	DID Nos ENG-5.1 to 5.4 are not listed. Or let "...in accordance with DID No ENG-5, consisting of the following:" read ".....in accordance with DID No ENG-5 and all sub-DIDs therein listed".

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Annex E Proposed URD Changes Resulting from Detailed Review of Section 5.3 – Data Item Descriptions

*** Add introduction: "The purpose of DIDS on this programme is to gather existing information on the earlier development of an off-the-shelf product, rather than to document development work special to this programme".

DIDs (General) (TR to seek Sirius DIDs listing from KH to check on DIDs structure & cover) **(Complete- read-across is logical & comprehensive- NFA)**

DID No PROJ-1.1 Should the Master Project Schedule also include Payment Milestones, to allow NZ MoD Budgetary Planning arm to plan detailed expenditure profile? Or is this done by some other mechanism? RFT Part 2 (Rules of Tender) Annex F deals with Payment Milestones for Vehicle Delivery, but no development payment milestones (eg for RGT milestones). Is this fully intentional? (RFT Part 6 para 16 also refers to a "Payment Schedule"). **(RFT Part 2 Annex F covers payment milestones adequately but, in a parallel review by Project Director Kevin McMahon, KM suggested the tenderer be given free reign to propose a Payment Milestone Plan- NFA, IB deciding way forward).**

DID No PROJ-1.3 As a result of the production of the Armoured Vehicle Risk Management plan, the following amendments to DID PROJ-1.3 – 'Project Risk Management Plan' are recommended. All changes to the original text are clearly marked in italics.

Description: The Project Risk Management Plan shall describe the Contractor's risk management processes, identify the project risks and the proposals for the management of those risks. The plan shall include, but is not limited to:

- A description of the Contractor's approach to risk management on the Armoured Vehicle Project.
- A description of the steps in the Contractor's risk management process.
- Details of the allocation of responsibilities *for risk management, including the involvement of sub-contractors.*
- An initial risk assessment of the project, including risks associated with its proposed sub-contractors, with a classification and priority assigned to each risk. *Such classification of risk should be undertaken in accordance with the attached definitions of risk probability and impact.*
- A copy of the initial Risk Register and risk treatment action plan

The Contractor is required to undertake quantitative schedule and cost risk analyses of their programme. The Crown expect to review such analyses during the periodic Risk Review meetings.

The Contractor shall develop the Risk Register in electronic format and properly control and maintain the register throughout the contract period to ensure that it is current and regularly reviewed. The Contractor shall provide the Crown, *and its nominated Risk Manager, remote* on line access to the Risk Register.

The Crown intend that a joint approach to risk management be adopted for the Armoured Vehicle Project, whereby open discussion with the selected Contractor will result in full agreement on all risks and the most appropriate mitigation strategy. The Risk Management Plan should identify how the Contractor intends to manage this arrangement. Such an approach shall not absolve the Contractor of its total responsibility for risk under the Contract.

The Crown intends to appoint its own independent Risk Manager to support the Armoured Vehicle Project. The Contractor must be prepared to provide full access to all aspects of the project for this Crown representative.

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CONTRACTOR FORMAT IS ACCEPTABLE FOR THIS DATA ITEM.

Rating	Probability (%)	Schedule Impact (Weeks)[1]	Cost Impact (NZ$M)[2]	Performance Impact
VHI	90% - 95%	> 6	> 2	Failure to achieve a major system function, severe reduction in capability, system failure or system not acceptable to the customer.
HI	70% - 90%	3 – 6	1 – 2	Failure to achieve a major performance parameter or system level degradation. Significant reduction in capability or availability.
MED	50% - 70%	1 – 3	0.5 - 1	Degradation of major performance parameter or numerous minor parameters. Minor reduction in capability or availability.
LO	10% - 50%	0.5 – 1	0.25 - 0.5	Failure to achieve a minor performance parameter. Slight reduction in capability or availability.
VLO	5% - 10%	< 0.5	< 0.25	Minor performance degradation. Potential reduction in capability or availability.
NIL	< 5%	No delay	No additional cost	Meets all performance requirements.

1. Schedule impact on achievement of any contracted milestone.
2. Cost impact on total project value (substitute currency of choice).

As a result of the above change to DID PROJ-1.3, amendments to 18.4 of the General Conditions of Contract are also proposed. These are detailed in Section 3.7 of this report.

DID No PROJ-2 — New bullet? "Reports on progress & forecast activity will be made with reference to CWBS item numbers"? **(Agreed)**

DID No PROJ-5 — VCRI is to "....verify that each element of the User Requirement has been met." It does not demand that VCRI is used to verify that other requirements of the contract have been met (eg from RFT Part 6)? **(Agreed- the words ".....verify that each element of the User Requirement, and all other contractual requirements, have been met." will be used.**

DID No PROJ-6 — Repeat note added to DID No PROJ-2?- "Reports on progress & forecast activity will be made with reference to CWBS item numbers"? **(Agreed)**

DID No OP-1 — The terms (vehicle) "variant" and "type" are used indiscriminately and (probably?) without different meanings. It may be worth defining the words clearly in RFT Part 5.1 1-5, then using the same meanings here? (Suggest the FOV consists of four IMV variants (IMV standard, IMVC, IMVR & IMVE) plus the FSV variant- a total of 5 variants, and that the term "type" is not used at all?).

There is no expansion of "Human Engineering Deliverable Products"-eg reports from analyses).

*** — **(From Army Review with KH: it was agreed that OP-2 requirements, essentially a datapack, was most relevant, and that this should be reviewed, re-numbered as OP-1, & re-worded by TR)**

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DID No ENG-2.2 to 2.4	Believe AutoCAD 13 may not be latest version. Is latest version required? (maybe say "latest version"?)
DID No ENG-3.5	(3rd bullet) "minimum levels of system capability required to complete the missions identified in the User Requirements." Does this mean the levels identified in the UR? If so, a reference into the UR is needed. There is no reference to the use of the definition of Battlefield Day (Annex E 2) and MEF (Annex E 7-13) in the Reliability Analysis.
DID No ENG-5	Lists no DID No ENG-5.3 (Tempest Test Plan) Does not differentiate between Test Plan applicability, ie some may be Series Production Test Plans, and some may only be Development Test Plans (eg 5.4 & 5.5?) Does not utilise the project life cycle phases or other terminology suggested in DID No PROJ-5 (eg "System Acceptance Testing (SAT) for series production acceptance testing). There is no mention of the Reliability Growth Plan referenced in DID No ENG-3.5. A sub-DID is also required for the RG Plan which should also reference Battlefield Day (Annex E 2) and MEF (Annex E 7-13).
All Software DIDs:	Believe IEEE/EIA 12207 may now be ISO 12207? (need double check).
DID No SOFT-1.1	(Typo) "Software Develop Strategy" should read "Software Development Strategy"?
DID No SOFT-2	(Typo-centre of page) "...life cycle software support..." should read ".....software life cycle support..."?
DID No SOFT-2.1	(3rd bullet): Is the term "system development schedule" used to elsewhere? (needs reference to its location?).
DID No SOFT-2.2	5.3.2 (usefully) demands "sufficient information.....to allow the NZ Army to understand how the armoured vehicle processes data, but the requirement is not flowed down to the DID SOFT-2.2. Such information could include logic or data flow diagrams?
DID No SOFT-2.3	(Typo) Title: delete "System" (this will also then align with terminology in text).
DID No LOG-2.4	Reference to location of LCC model MS Excel Spreadsheet required? (currently loose document?)
DID No LOG-6.4	".....provide details of all processes that it introduced as part of the Armoured Vehicle manufacturing process" -may indicate new processes introduced for NZ Programme (only). Believe NZ MoD wants details of all processes used for NZ Programme? Suggest reword?

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Annex F Comments from Meetings and Visits

Schedule of Meetings/Visits

A. Meeting with Robin Johanson (Dep Sec for Acquisition) @ MoD Main Building 21-Jun-99.
B. Meeting with Lt Col Martin Dransfield (CO Designate 2/1 RNZIR) @ MoD Main Building 24-Jun-99.
C. Meeting with Col Ian Gordon (ACGS Development) @ MoD Main Building 25-Jun-99.
D. Meeting with Col Jeff Bright (ACDS Logistics) & Lt Col Peter Cunninghame (GS01Ops/Plans) @ Trentham & Maj Simon Williams (Facilities & Infrastructure?-Logistics) 28-Jun-99
E. Meeting with Maj Gen "Morrie" Dodson (CGS) @ MoD Main Building Wellington 29-Jun-99.
F. Meeting with Lt Col Mark Wheeler (CO Armoured Regiment) @ Waiouru 30-Jun-99.
G. Visit to ATG (Army Training Group, hosted by Cap Colin Huston HQ ATG) Waiouru 30-Jun-99.
H. Meeting with Lt Col Kevin Burnett (CO 1 RNZIR) @ Linton 01-Jul-99
I. Meeting with Lt Col Charles Lott (Lt Col Command & Implementation of Policy-Logistics?) @ Trentham 01-Jul-99
J. Several short meetings with Lt Col George Rooks (Primarily review of RFT Annexes, Army 2005/2015, Jameson Report, and initial thoughts on Transition Plan (latter 01-Jul-99))
K. Meeting with Peter Ware (MoD Director of Projects) 02-Jul-99

Reference codes (hosts/people met)

(IB) = Mr Ian Benfell (Project Manager, Armoured Vehicle Programme, MoD)
(KH) = Cap Kelvin Hawley (Project Engineer (Army) seconded to PM AV Programme)
(SW) = Maj Steve Wagner
(RJ) = Mr Robin Johanson (Dep Sec for Acquisition, MoD)
(MD) = Lt MW) Col Martin Dransfield (CO Designate 2/1 RNZIR) (MD is responsible for all new equipments for the Army, except the new AV. (MD has seen "too many people just do the AV programme"))
(IG) = Col Ian Gordon (ACGS Development)
(JB) = Col Jeff Bright (ACDS Logistics)
(PC) = Lt Col Peter Cunninghame (GS01 Ops/Plans/Logistics)
(SW) = Maj Simon Williams (Facilities & Infrastructure- Logistics)
(Gen) = Maj Gen "Morrie" Dodson (CGS)
(MW) = Lt Col Mark Wheeler (CO Armoured Regiment)
(CH) = Cap Colin Huston (HQ ATG Waiouru)
(KB) = Lt Col Kevin Burnett (CO 1 RNZIR)
(CL) = Lt Col Charles Lott (Lt Col for Command & Implementation of Policy- Logistics)
(GR) = Lt Col George Rooks
(CJ) = Maj Craig A Johnston (GSO2 Operational Requirements (Combat))
(PW) = Mr Peter Ware (Director of Projects, MoD)

The new merged "NZ Mounted Rifles" organisation & implications for the AVUR.

(i) (MW, ie Lt Col Mark Wheeler:). QAMR (Queen Alexandra's Mounted Rifles) is NZs oldest Regiment, and has traditionally been the best equipped regiment, having previously used Centurion, M41, Scorpion, M113 and Ferret equipments. It currently uses 73 M113s. The AV Programme represents the Army's biggest equipment overhaul since WW2. The visits showed excellent communication between Lt Col Mark Wheeler (CO QAMR) and Lt Col Kevin Burnett (CO 1 RNZIR, based in Linton, NZ North Island), strong concurrent views on a new merged "NZMR (**New Zealand Mounted Rifles**)" organisation, embodying 1st & 2nd Regiments (1RNZMR & 2RNZMR)- essentially an Infantry organisation with strong Firepower Support and, later, with introduction of the LOV (Light Operational Vehicle), Reconnaissance capability. (Context from FDP- A Battalion Group will be the maximum commitment, but to achieve sustainment 2 fully equipped Battalion Groups are desirable. The need for training pools is, therefore, avoided).

(ii) Although the sequence of the meetings did not allow HVR-CSL to assess similar concurrence in the mind of Lt Col Martin Dransfield, CO Designate 2/1 RNZIR, to be based in Burnham, NZ South Island, there is no evidence to the contrary. Commanding Officers and their Regiments are well prepared to commence the merger.

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and only **final agreement by CGS (Maj Gen Dodson) is required** for the merger to be widely communicated. Higher levels of the Army organisation may have some doubts about when the AV is coming, and may feel there is reluctance in the Regiments to re-organise- but the evidence (MW, KB & others) is that this is not the case, and merger will be a rapid process- there is a real desire to make it work, and only CGS commitment is needed. KB hopes that staff from the Armoured Corps will be in place in the new organisation by end 99. The organisation, and the numbers of AV variants required, are shown in the FDP (Force Development Plan) for the AV Programme.

(iii) The new RNZMR organisation is within what is regarded as the **Minimum Brigade Structure**, ie 2 Manoeuvre Battalions, which will be taken forward into Army 2015. There remains the task of embedding the "manoeuvre culture" into the organisation- much recent exposure on exercise has been in Singapore where operations have been primarily on foot. The new organisation has been likened to the USMC (US Marine Corp), ie a flexible multi-tasking force capable of rapid deployment. The NZA is to become more of an **"Urban Army"** (GR), with more consideration being given to where people wish to live, so that recruitment can be maintained- hence there are moves to constrain investment in Waiouru and increase investment in Linton. (GR) "If we want to keep people in the Army, we need to put them where they want to live".

(iv) (KB) There is concern about possible (long term) **reduction in the size of the Infantry Section**- current 7 + Section Commander may become non-viable away from the vehicle if numbers are reduced (say to 5 + Section Commander). The section can be away from the vehicle for up to 72 hours, and commonly for 24 hours. KB is also not convinced that the "Golf Bag" approach is viable (Training in 84mm, sustained fire m/c guns, AAW as well as Individual, Infantry & some Vehicle skills are unlikely to leave time for much else?)

(v) The QAMR has organised **posting preferences** (to Linton or Burnham, and for Fire Support or Recce). Some QAMR staff are now taking orders from future 1st Battalion CO in Linton. QAMR has always been equipment focussed, and therefore motorisation is likely to give ex-QAMR soldiers fewer problems than may be experienced by the Infantry. By the AV Introduction Date, all soldiers will have re-located, and QAMR will be fully merged (MW). In the longer term there may be a Brigade Recce Squadron, using FSVs and LOV with a new sensor pack. Ex-QAMR staffing will therefore fulfil most FSV, and some Recce roles using LOV, in the new RNZMR organisation.

(vi) **Territorial Force (TF)**: (MD) NZ has a regular Territorial Force rather than "Sponsored Reservists". Numbers have been reduced from 4500 to 1500, but there is now a high level of confidence "that they will turn up". Individual training is done in TA Units, but TA integrates with the Regular Force for equipment training, eg they will typically become Nos 7 or 8 rifleman. Any deployment will typically have 10% TA (similar to UK)

AV Transition Plan & implications for the AVUR.

(i) It is true that the AV FDP was only approved in Apr-99. Communication of plans for introduction of the AV into service are being discussed and communicated with varying success, and in some cases verbal communication is excellent. What appears to be missing is formalisation of plans- little appears to exist on paper. There is an urgent need for formalisation of a high level **AV Master Transition Plan** for introduction of the AV (as at 01-Jul, GR is drafting this, and it should be presented to CGS on 12-Jul, and go public by mid-Aug-99). This is important to allay some of the frustrations associated with uncertainty about the future, and to ensure that "Outputs to Government" are maintained. (Note from 02-Jul GR meeting- a working group has met at least 4 times to draft such a plan- this is run by HQ Land, just below CGS level). The plan as currently drafted is based upon the "Response to an Operational Contingency", ie it shows which equipment would lead a response. Current situation appears to be that, while Plans are uncertain & may change, they are not being communicated downwards- so most people in the organisation know something (an armoured vehicle) is coming, but they don't know what, how or when.

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(ii)(IG) NZA has had extensive discussions with Canadian Army opposite numbers (including "with Commanding Officers & in the vehicle parks"), and understands the problems involved in introduction of eg LAV3- though such discussions do not appear to be well documented (TR?) (IG anecdote: Australia spent $5M on LAV steering problems before it decided that the main problem was the use of tracked vehicle drivers who tended to "attack" obstacles, where truck drivers would manoeuvre over & around them) .

(iii) **Introduction sequence:** QAMR (MW) expects priority in the allocation of AVs to be given to Linton and, if the AV budget or other factors do not allow 2 full Battalions, then Burnham may be used as a "Top-Up Battalion". First introduction into service would therefore be through Trentham for PRI (Post-Receipt Inspection), codification, registration, etc, to Waiouru for initial training, then into service based in Linton. The vehicles should be based where the soldiers are, ie initially mainly at Waiouru, with some at Linton, and the Linton presence increasing as initial training completes. There is a major concern (albeit in N Island staff) that CGS may want initial deployment to South Island- though if a second buy proves not possible, the priority may change to N Island **(Recommendation: if this is to hold, it is important that the rationale is established & communicated- the uncertainty is currently a major distraction).**

(iv) **Broad Timelines:** (KB)

- Last ¼ 99: O'seas Familiarisation Courses (eg in Canada if LAV3 is chosen)
- Jan 00: First briefs on timelines are planned to take place.
- Mid-00: Trentham will have FOV in the Inventory, and Waiouru & Linton will start to see vehicles.
- End 01: All vehicles will be commissioned in the new organisation.

(Note: FDP suggests full fleet (1st buy) in service by Sep 02).

There appears to be 2-year cycles to attain/retain capability- this equates to start 00 to end 01. Vehicles should probably be delivered 12 vehicles at one time, to synchronise with Waiouru training capacity, though a first batch of 24 (FSV) should not be problematic. **(Recommendation: the above, confirmed & fleshed out with GR should be sufficient for an indicative "Desirable" delivery schedule to be included in a follow-on data pack (PW concurs with need for schedule)).**

(v)**Operational Skills Base:** (MW) QAMR (as was) is maintaining Turret/ Gunnery skills using a Scorpion turret trainer (stand-mounted using a spotting rifle attachment). Soldiers have also been deployed in Bosnia on UK Warrior and Scimitar. There has been recent experience in Australia (on Leopard), and ANZAC exchange-training on ASLAV (LAV 2 which has around 20% commonality with LAV3) could prove to be particularly useful. 2 Sergeants have recently been on detachment with the USMC, which also has LAV.

(vi)**Infrastructure:** Open Shelters present at Linton (& Burnham?) are <u>not</u> appropriate for AV garaging, and should be discounted quickly as an option. "Ownership" of the vehicles must be fostered, and the crews not hindered by poor weather (wind/rain/snow), and wind-blown debris & volcanic dust, in their potentially increased crew-maintenance. The other major consideration is security- particularly the security for weapons & radios in the light of non-secure perimeters in NZ camps. The underfloor, hot spring-fed, heating at Waiouru offsets any disadvantage in ambient temperature, and is a distinct advantage in a closed garage. Construction of Burnham Buildings will deliberately lag those at Linton, so that lessons can be learned from Linton & used to improve the Burnham equivalents.

Revised CSS (Combat Service Support) Organisation & implications for the AVUR.

(i)The **purpose of the Support organisation** is to "Support the Force"- "the vehicle must not stop, or the initiative may be lost" (CL). There will be embedded, seconded support & facilities at a base level for the Units, with the base level being supplemented by mobile "top-up" or "surge capacity" resources as required (KH). It is important that there is continuity in the maintainers- so that vehicle users know who to go to, and confidence can be built in the ability of the Team & its individuals to solve problems.

(ii)There will be an **Annual Directive on Support policy**, then a monthly-updated **Master Activity Schedule**, which forewarns of upcoming exercises and after workload peaks, and allocates priorities (CL). Any non-

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deployable support capability will be a potential candidate for out-sourcing (JB). **(Recommendation: An outline of the new support Organisation should be provided with the RFT as a supplementary data pack)**

(iii)(MD) NZ Army has been through the loop on **contracted-out support** -when deployed, who supports the equipment? The contractor may choose not to be there. NZA is at decision point on support. (IG) in ILS, "the less owned the better, to a point- for example field repair will always be done by the Army".

(iv)The AV should have been developed in an ILS (Integrated Logistic Support) culture, so that ILS is designed-in (not an add-on).

(v)It is anticipated that support equipment will be held in Linton & Burnham but, if the vehicles move to Waiouru, the support will go with them (CL). Support Companies will utilise IMV-E and IMV-R, as well as the new LOV (Light Operational Vehicle- "Hummer" or similar) in large numbers. (CL) In the Field, the maintainer will go to the vehicle, but the maintainers will need comparable mobility (IMV-R, etc). (JB) There will be very little LRU (Line Replaceable Unit)/ MSI (Main Support Item) repair out in the field. "Buildings are a comfort that we have in Barracks", and the Australians, for example, work widely in the field out of containers (JB).

(vi) BIT/ Diagnostics could be expanded in the URD, if time allows, though detailed contractual negotiation will be necessary in any event. There will be a general move away from Pits (too permanent) and Jacks (need stable ground) to the use of Field-Deployable Hoists.

(vii) MW & others suggest there would be horrendous problems maintaining a dual fleet, AVs and M113s, for any length of time (eg special tools holdings & skills base, training load). The overlap is unlikely to exceed 12 months.

(viii) **Maintenance Skills Base:** (MD) The skills base is sensitive to turnover- currently the rate is high. Other programmes are needing new skills at the same time (eg MR Anti-Armour). The Army is starting to address new trades & structural requirements. Eg current "Comms & Optronics" trade may require breaking down to encompass separate Comms, Optronics, Electronics, Control, Power, "Crypto" and perhaps Software trades. It is of particular concern that numbers of technicians for Optronics & Comms are very low- several more will be required, and recruits should probably be on courses for fundamentals (fire control, optics, control, etc at Universities/ colleges) now! It currently proves difficult to train then retain the skills base. Action should start now to recruit adequate apprentices to put through the new skills training. New skills must be defined, then tradesmen put to college for technical training, then to Prime Contractors premises (with the Instructors) for familiarisation. **(Recommendation)**

(ix) (MW) It was noted that Scorpion was "grounded" 3 times under Warranty. It is important that **Warranty** commences when the AVs are delivered to NZ, and not when they come off the production line. Otherwise, if AVs are delivered in Company or larger batches, the Warranty could be running up in the manufacturers premises.

(x) **Crew level maintenance:** There is concern (MW, KB, endorsed by CL) that there will be too few Logistics personnel organic to the Unit, and that crew-level maintenance on a more sophisticated vehicle, and particularly the training for this, could be a distraction from operational training, which in itself will demand new skills. **(Recommendation: this issue should be addressed urgently by the Support Organisation in conjunction with Operational Unit staff)**

(xi)**Garaging:** Darwin (Australia) is getting lockable, fully enclosed, garages, and it is anticipated that Linton & Burnham will have these to facilitate crew level maintenance. 16 Field Regiment (Artillery) at Linton is a further example (CL). The Director of Property Management (MoD) surveys building & civil engineering requirements. Particularly in view of the fact that NZA Camps are not secure, secure/ guarded garaging facilities will be essential- main weapon (cannon) will be left in FSV overnight and, if IMVs have overhead weapon station, their 0.5 in weapon will, similarly, be left in place. Laser equipment, particularly rangefinders are a further security issue. Building materials must be consistent with risk from earth tremors and foundation movement.

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(xii) **New Support Equipment**: (CL) There is much generic Support Equipment on the Capital Expenditure list (PM AV Programme should obtain a copy of this to ensure there is no duplication in AV STTE (Special Tools & test Equipment).

(xiii) **Spare parts: (Recommendation)** The RFT should demand guaranteed availability & lead times for spare parts (major problems have been experienced in the past, with LRUs taking a year to turnaround. It was also necessary to set up a repair facility for the Scorpion transmission because Alvis in UK could not respond adequately. The need for LOT (Life Of Type) buys must also be avoided- supply should be sustainable & ongoing, with minimum inventory. Note: LE (Logistic Executive) currently manages the spares inventory, and provide parts to SPEL/Williams and Adams (the Depot Repair Civilian Contractor) for Depot Level Repair, though Field Units will, in future, demand spares from SPEL/WA.

(xiv) **Repair pool/ quick repair:** The plan to have no repair pool of AVs means a cultural change to a customer focussed repair capability with very rapid turnaround. There is concern that, if vehicles are put into the Field Workshop, they could be there for 2-3 months (in addition to delays due to the organisation, & shortages of manpower, there have been delays due to poor delivery times on parts from suppliers). Vehicles could therefore tend not to be submitted for repair, & consequently become poorly maintained. The repair organisation will need be run like one large QRB (Quick Repair Bay), where problems can be discussed face-to-face, rather than "processed" (KH). **(Recommendation: there is a need for the Support Organisation to check that anticipated turnaround time for AV is commensurate with absence of a repair pool, as assumed by the RFT).**

(xv) **Trentham:**

- In general, current allocated floor space @ Trentham appears adequate, with the exception of the Electronics workshop. This will probably fill very quickly to support AV, and extension into other existing building space may be required. **(Recommendation: once the new skills base & skills requirements have been assessed, an estimate of floor space for comms/optronics and new skills should be completed urgently)**

- Although the quality of the SERCO rebuilds could in no way be assessed, it may be expected that the AV Prime Contractor will recommend putting engine & transmission rebuilds (eg Caterpillar, Allison) in the hands of commercial operators- better quality (due to familiarity & throughput) at lower cost would almost certainly result.

- **(Action for URD, in hand at 02-Jul):** An outline description of the **SPEL (SERCO Project Engineering Limited)/Williams & Adams Contract**, to manage the Base Workshop Facility at Trentham, should be included in the RFT (5.2-Support). (Note Williams & Adams is, among other things, the NZ Caterpillar agent). The contract is in the 2nd year of a 6-2-2 year contract, appears to be running successfully and progressively extending in scope (now including electronics & armament). It allows SPEL/WA to manage Depot Level Repair, including return of equipment to the manufacturer. SPEL/WA uses many ex-service personnel and is "just like another Army unit" (JB). The description should give adequate information for the tenderer to make an initial assessment of whether (or not) this is an organisational element on which to build his Base Workshop support proposal.

(xvi) **Waiouru:**

- 4 Field Workshops has the ability to lift turrets up to MBT size (some W facilities were originally built for Leopard Tank, which were never procured). Waiouru has facilities to do 2nd Line & Field Grade Repairs, and could go further if necessary. This, plus the QAMR workshop, are to be amalgamated (CL).

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(xvii) **Linton:**

- The Support Organisation includes HQ 2 Log Battalion, 2nd Workshop Company: (Field Grade Service/ Repair Facility- 5 tonne craneage, apparent big backlog in work (vehicles). Workshop requires a 5-Bay extension for AV), 10 Transport Company (Was transport squadron- transports combat supplies), 21 Field Supply Company (Stores combat supplies- includes 47 Petroleum Platoon), QRB (Quick Repair Bay) (subset of FGSRF for smaller tasks/ equipment), 2 Field Squadron Combat Engineers, 2/5 Combat Engineer Support Squadron, and Combat Engineers- Engineering Workshop.

(xviii) **Burnham:**

- Burnham was not visited due to constraints on time, is reportedly modern (late 80s), but will require extension. It is assumed that there is a 10-Year Long Term Development Plan as for Linton. Burnham reportedly (like Waiouru) has the benefit of spring-fed underfloor heating.

- Improvements for 3 Field Workshop (Burnham) are not funded until 2002-3. Support problems may be experienced and, for this & other reasons, 2/1 RNZIR (to be 2nd RNZMR) will not be in a position to take up the lead in any Contingency until Mid-2000. (GR). There is also a PR danger here- if there is a Contingency situation before this; M113s are deployed, and there are casualties, then the public will ask "Why was the latest equipment not used, and these lives saved?" There is therefore a risk that AV will be deployed before planned date.

Suitability of the AV requirement in an Army 2005/2015 context.

(i) (MW) Army 2005 concept attempts to make the two new Infantry Battalions equal, but funding will probably not allow this. Moving towards army 2015, maybe in 10 years time, the intention is to use the TF (Territorial Force) base to top-up the 2 Battalions as individuals. At CO level there is a suspicion that, in the 2015 timeframe, all AVs will require a turret & cannon. **(Recommendation: the recent (GR/IB) decision that the UR should reflect IMVs with no "fitted for but not with" capability should be endorsed by CGS and communicated clearly throughout the organisation. Note, however, has GM Canada ever built LAV3 hulls <u>without</u> a turret aperture? If not, there may be development cost implications)**

(ii) Certain of the "Desirable" requirements in the UR are unlikely to be purchased, or even available (eg top-attack armour). However, their inclusion should provide data which will be useful in looking ahead to Army 2005/2015, and identifying technical growth paths.

Initial assessment of current & possible future training resources and implications for the AVUR.

(i) The FDP reflects the decision taken that the Armoured Vehicle will be wheeled. This decision opens up the possibility of limited vehicle training in "home" locations (Linton & Burnham). Reference document: "Army Training Harmonisation Study" (not yet reviewed). It is impossible to do Battalion live firing in NZ- will probably need go to Canada. Manoeuvre can be only up to Company level, ie 12 vehicles (MD).

(ii) **Waiouru:** (Note: Waiouru means "The place all people must pass through"- an appropriate logo for those training in the future?)

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- **ATG (Army Training Group), General :**

- (MW/CH) The size of Waiouru, at 156 000 acres (21 x 23 miles), the climate, variety of terrain, water facilities, ease of access and isolation, must make it **one of the worlds best training facilities**. The availability of an Airfield capability for C130 operations may be of great value in training Rapid Reaction Operations. Its use by foreign forces (eg Singapore artillery) is potential income for NZ Government. Training regimes and new mobility envelopes for wheeled vehicle mobility training must be developed, but plans are underway. However, the Defence Minister has indicated future **down-sizing of Waiouru**. This, coupled with the fact that most people do not want to live in the Waiouru area, and that access to, say, Taupo area is not reliable in winter, means that Investment in Waiouru is likely to be constrained. **Residential Accommodation:** Accommodation for 1000 families has recently been reduced to 500 families. (CH) Responsibility for Wild Horses, other wildlife, flora & fauna is being handed to the Department of the Environment?

- (MW) It appears that the Officer Training Depot will stay. On the day of the visit, the School of Armour was formally merging with the School of Infantry, as originally proposed by Brigadier Jameson in the Jameson Review. (MW) The Army Individual Training Review merges Armour & Infantry skills, but the way in which this will happen in practice is still being evolved.

- (MW) A new moving target range (with vehicle & infantry targets) is anticipated, as well as a special forces close target facility (also useful for Infantry/Peacekeeping training?). (MW) **Stab circuit:** There appear to be 2 options: Paradise Valley (currently swampland) and the North Area (which currently has limited access). Concrete hardstanding at road/range interface is required to avoid the dragging of mud onto public roads. (GR suggests MTR & Stab Circuit are the same range). (MW) Heaviest usage recently has been 11.5 tonnes-tracked- M113.

- (MW/CH) Fire risk Dec-Mar is very high, and this may impose further constraints on areas available for live firing- information on ammunition natures (including tracer, etc) is required to assess fire risk **(Action for RFT-DID?)**. (HVR: Current use of helicopters & M113s to tackle inaccessible fires, both valuable assets put into high risk situations, probably warrant wider use of "fire breaks" & fire-fighting pools (for helicopters to fill monsoon buckets)- in any event, the new AV can not be expected to replace M113 in this role, both for reasons of mobility, and asset value!

- (MW/CH) Although ATG is a military zone, and there is no public right of access, it is not illegal to overfly. ATG anticipates a safety ceiling of around 10 000 ft for the 25mm weapon. QAMR suggested 25mm weapon may have a template of 16 km **(Action for RFT-DID- safety ceiling + template/ back space is required for all ammo natures).**

- (CH) **Wading/ watermanship:** Fording of streams & rivers- some work on approach/ departure areas may be needed to help accessibility & allow use of self-recovery winch training in new AV. Robinsons Pond appears suitable for wading training.

- (CH) High speed of new AV may make dust clouds near Highway 1 a hazard in Summer- AV training may need stay further away from Highway 1?

- **ATG Training Plan:** Lt Col George Rooks should have a copy of the ATG Transition Training Plan.

- (MW) **School of Armour/ Gunnery Wing:** 4? Indoor Gunnery Training Bays. One stand-mounted Scorpion Turret trainer is retained, so that NZA retains gunnery skills. This trainer uses a "co-axial" .22 rifle spotting rifle, bracket mounted, firing into a sand butt. It is anticipated that a replacement system, which would be duplicated at Linton (& Burnham), would be a laser-based system (also for IMV?), probably with projected scenario/ target arrays, and may allow for a real vehicle to be driven into the Bay (this may be preferable- as the Crew will "own" its vehicle, and feel more comfortable training in that, rather than a special training turret). Day/night gunnery training will be required. Other conventional stand-mounted training aids (for weapon & mounting) will also be required (as held for Scorpion).

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- (CH) **Budget for ATG upgrade**: ATG claim current budget is barely adequate to maintain current roads. A substantial upgrade is required to accept new AV and other new equipments (eg LOV). Potential contractorisation of the range, probably with military staff at the head, is under investigation. The NZDRER (NZ Defence Real Estate Review) may influence the available budget.

(iii) **Linton:**

- Has no facilities for AV training on the camp (only Individual Training & Infantry Skills), though there are plans in concept for a "Close Training Area"- maybe 15 km from Linton. This could be around 4x2 km in size? (GR).

- KB confirms he expects most AVs to be based at Waiouru, where they will be used (for training). KB anticipates that soldiers will typically spend 1 week per month at Waiouru (as current). As initial training is completed, more vehicles are likely to return to Linton. Particularly as, more than ever before, the vehicles will be part of the organisation, dislocation of crews from vehicles (@ Waiouru) may be a problem (TR-though use of simulators should moderate this effect). "Watermanship" facilities appear excellent at Linton. A number of options for transporting crews between Linton & Waiouru were discussed. It is possible that:

  * Where Infantry are to be transported to W, and there is potential for dismounted Infantry training en-route, then trucks may be the most suitable means of transport.
  * Where there is no potential for en-route training, then coaches should possibly be used.
  * There will rarely be justification for crews to travel in AV to Waiouru, as AVs will normally be there semi-permanently, and no off-road manoeuvre or gunnery training is likely to be available en-route.

- There is little evidence that any useful training could take place in transit between Linton & Waiouru. KB mentioned, for example, that 7 Bn (TA) at Hawkes Bay has some accessible areas, but this is hardly on the way from Linton to Waiouru, and facilities would be very limited. Though an occasional road march would be valuable, it seems important that unnecessary running is avoided.

- Linton "10 Year Long Term Development Plan" refers. (Note Phase 1 has $19M costs allocated to "Motorization of Battalion" in year 11! **(Action: Check these costs are consistent with AV Programme Costs)**

- Individual/ Infantry training can be supplemented by Training Bay (updated Waiouru Gunnery Wing type facility) readily at Linton. Limited driver training- maybe low cost driving simulator **(Action for RFT?)** supplemented by a short "all-weather" driving course may be worth considering? **(To be considered in Transition plan?)**

(iv) (MW) **Overseas Training**: Training in Australia is likely to be used to supplement Waiouru- the new Mechanised Infantry based in Darwin is likely to be a source of useful exchanges.

(v) **South Island:** In general, the South Island may have manoeuvre space, but manoeuvre in combination with FSV firing is a problem. Burnham will probably have to use Tekapo for training, supplemented with N Island vehicles at Waiouru. Tekapo: has severe restrictions on usage, and the number of people allowed into the area.

(vi) **Initiation of AV training:** (JB) The Prime Contractor will train the trainers. (MW) ATG would prefer to see AV coming through a Company at a time. Re-use of existing Gunnery skills will be essential to avoid a skills gap. Training timescales suggested were 3 months for Individual Crew Training, then 3 months for Collective Training, though the two can overlap to some extent. ATG can handle a maximum of 12 vehicle crews at any one time. (MD) Regarding the ability to use the ground & map read, the Infantry has only had low speed capability. High speed (100 km/hr) skills must be learned. NZ soldiers <u>will</u> be able to adapt; they have a good track record.

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(vii) **Manning shortages:** ATG is likely to be short of Instructors- as soon as a Prime Contractor has been selected, it will make sense to get Instructors seconded to the Prime Contractors premises for initial equipment familiarisation. (Otherwise, early delivery of one or more reference vehicles (FSVs?) would be wise). Though RNZIR Instructors, who tend to specialise (eg Mortarman specialist) and RNZAC Instructors (who tend to cover all skills) will be amalgamated to produce MR (Mounted Rifleman) Instructors, shortages are likely to remain. There appears to be a particular shortage of drivers, & the NZ Land Transport Safety Regs, introduced in May 1999, have meant that drivers must be re-qualified. The 1st batch of 15 have just graduated. (It is likely that the vehicle crew (2, or 3 for FSV, to plus a couple from the Infantry Section) will probably need AV driver training, and FSV commanders will need complete driver training before commencing commander training.

(viii) **Simulation**: (KB) Simulation is anticipated wherever the Units are based. Linton 10-year Long Term Development Plan shows the introduction of a Simulation Centre. (JB) Simulation centres are planned for each Camp (Linton, Burnham, (& Waiouru?)). Without access to the Simulation Concept Paper, which is in the process of review, (in the custody of Maj CA Craig Johnston) 3 main applications of Simulation in training appear under consideration for the Army:

- **IWES** (Individual Weapon Effects Simulator?)-currently used in training?- strap-on laser target marker/ target for Infantry Training? –needs extending to include vehicle training? CHECK ALL THIS ON IWES.
- **Command & Staff Training** (already in use at Trentham) Burnham & Linton will each have 8 work stations using JANUS.
- **Driver training** (KB thinks may be essential- TR: possibly a low-cost driver trainer at Waiouru, Linton & Burnham, used prior to driver training on a real vehicle. Note: Commanders & some of Infantry as well as regular drivers must driver train. Note, however, GR warns that trainers that are too simple and non-representative will not be used by crews.
- **Gunnery Training** on indoor range to Troop level (6 vehicles)- may be suitable for inclusion as part of AV (FSV) Programme envisaged as- a single facility, using all/some real vehicles (shortfall would be stand-mounted turrets- if such a set-up has already been developed) with screen & computer-generated target arrays for training to troop level ("similar to US Marines set-up"). Likely to be required at Waiouru, Linton (& Burnham) in the future. This type of simulation is undoubtedly the priority for the AV programme.

(Action: AV programme, & simulation in that, must be integrated with overall Simulation concept: ie outline requirement for AV Simulation should be drafted & communicated to CJ for comment)

Anticipated AV "Growth" and implications for the AVUR.

(i). **OA**, to decide direction in all the following issues, will be essential in year 00-01. Such OA may influence the AV requirement for second buy.

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(ii) **Weapon growth:** (MW) Growth, probably to 30mm, is likely to be required, and AAW is not a substitute. QAMR realises that 25mm will not do everything (TR raised experience of BA in Bosnia- problems of range with 30mm RARDEN- eg when attacked by mortar emplacement across a valley, at say 3-4 km range, 30mm could not respond). The tenderer will offer 25mm as the lowest priced option. MW thinks retrofit of larger turret is likely to be the requirement. (TR- could ask Tenderer to demonstrate retrofit of 30mm weapon?). (MW) The importance of OA and the Tekapo Manoeuvres in deciding the direction of technical growth of the AV beyond the introduction into service has been emphasised. Such exercises should, for example, decide the growth path for the weapon. Commonality of weapon & ammunition with the Australians (who, it was suggested, can't fire some 25mm natures- incl FS?) is less important than Firepower **(Recommendation: subsequent discussion with GR & IB gave the following solution: There is too much risk in second-guessing future requirements for Firepower (which could be 30mm/AAW/other/ even 105mm- though latter is firmly discounted by CGS) and this is likely to be determined only by operational use of 25mm/ OA/ Tekapo exercises. The option of buying 30mm turret with 25mm weapon should, therefore, be discounted. Recently (start Jul-99), CGS has given support in principle to acquisition of Overhead Protected Weapon System for IMV (currently desirable in UR). This probably discounts the retrofit of turrets to 1st-buy IMV, and therefore the option of making IMV fitted "for but not with" turrets should be discounted. The philosophy is, therefore, that if the requirement for FSVs changes then a further two companies of FSVs with upgraded Firepower would be bought- recommendation-: this should be clearly reflected in the AVUR)**

(ii). **Infantry Section size:** (MW) thought IMV, with current planned Infantry Section of 7, may transition to IMV with turret with Infantry Section of 5-6? (TR- essentially, any reduction in Section size would have to be matched with an increase in mechanised-type equipment including Firepower).

(iii) The viability of the **"Golf Bag"** approach has been questioned but, for it to remain as an option, adequate stowage space should be available.

Other miscellaneous points for the AVUR

(i). The constraints on the AV envelope imposed by **NZ Rail Transport** have not been established. MW suggested that AV may give problems in NZ rail tunnels, but it seems unlikely that constraints will be tighter than those imposed by C130 (around 2.5m overall height, 2.7-2.8 width). In any event, rail transport, which is narrow gauge in NZ, **appears not to be used**.

(ii). Australia is upgrading **M113**s to A3 standard @ $(NZ?) 600 000 a copy. Operational shortcomings, plus NZ$ lack of requirement for in-country engineering/development capability, will probably continue to discount this as a NZ option. Any such upgrade would potentially rob the AV Programme of adequate funding to reach critical AV numbers.

(iii) MW emphasised **the importance of the AV being in ABCA service**- "there is a 99% chance that we will have a coalition partner from an ABCA (America, Britain, Canada, Australia) country".

(iv) There is a need for **a breakdown on likely mass** pre issue of RFT: TR suggest a 17 tonne combat mass vehicle is likely with growth to 18 tonne. Heavy wheeled MRAV 6-wheel solutions are likely to be discounted for reasons of C130 transportability (width)- an Essential requirement, and also on the basis of NZ axle loadings.

(v) (MW) **"IMV is an FSV without the turret**. If there had been the funding, all vehicles may have been FSVs, and by 2015 we may yet have that". KB would have liked Firepower on every vehicle but, within the constraints of the budget, is happy with "fitted for but not with". (But see "i(i)" above).

(vi) (MW) **FSV:** The Australians & USMC put people in back of FSV. This is not a critical requirement for NZ FSV.

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(vii) **Security:** There is widespread army concern about security on the new radios, and the associated "crypto", to come into service; and whether this will mean that radios/crypto must be secured (incl physically locked) into the vehicles, or whether a secure store will be required. **(Action: main action is for radio programme to communicate through Army, but AV Programme must ascertain what security arrangements will be required in the vehicles)**

(viii) **BTR 80** "had the best serviceability in Bosnia" (CL).

(ix) **Operating Environment**: (IG): Environment is defined by QSTAG (quadripartite standard), but upper & lower extremes have been deleted for NZ. Outside the specified environments, specialist vehicles are required anyway (means low ground pressure, etc?), and therefore funding should not be wasted equipping the new AV to this range. Likely environments for new AV are N Australia to Eastern Europe. (25/6: KH retains concern about the low temperature range specified).

(x) SAP: (MD) SAP is being introduced for maintenance/training/resource management, etc. **(Recommendation: current SAP implementation should be outlined in the UR, as a basis on which the tenderer could build a SAP enhancement in support of AV)**

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8 August 2000

Minister of Defence

Purchase of Light Armoured Vehicles

While this is a very important and necessary acquisition – it is both the Government's and the NZDF's first priority – I have explained to you orally that there is some history, which you need to be aware of, about the way the light armoured vehicle project has been developed.

This project is being driven forward at this time:

- because of the Government's wish for quick action to upgrade the Army's mobility and fire support capabilities. This was an unambiguous first priority in the Defence Policy Framework;
- because there is a need to approve or reject the Raytheon Project Sirius bid by 25 August, (a third priority item in the Defence Policy Framework) and the Government naturally wants to consider its options for the Army upgrade first;
- because we now have a best and final offer from General Motors (Canada) for providing the LAV III light armoured vehicle; and
- because the army tactical communications mission systems project which is dependent in part on armoured vehicle numbers is also ready for Cabinet consideration.

Concerns have been expressed with aspects of the project in four areas:

1. Lack of clear strategic guidance

- what are the tasks the Labour/Alliance Government envisages for the land forces?
- what capabilities are needed?
- is current land force doctrine appropriate?

Current strategic guidance for the land force comes from the 1997 White Paper – *the Shape of New Zealand's Defence Force*. Land Force doctrine, including motorisation of the NZ Army was developed from this. This guidance has not been endorsed since the

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Defence House, Stout Street, Wellington, New Zealand, PO Box 5347, Lambton Quay, Wellington, Telephone (04) 496 0999, Facsimile (04) 496 0859

election and is not fully compatible with the Defence Policy Framework. In recognition of this, the Framework directed a review of land force planning and capability to be completed by November 2000. This review is underway.

2 The present project was slanted towards a particular outcome

- originally this was the Australian ASLAV; the LAV III is a more capable, more adaptable and more expensive development of the ASLAV;

- the vehicle had to have wheels (tracks were excluded);

- a common hull was required for all variants (unlike the Australian Army, the NZ Army, for good operational and maintenance reasons, did not want to have separate FSV (ASLAV); APC (M113) or IMV (Bushranger) designs).

The original NZDF specifications were too outcome specific. They were changed following an independent validation and verification, but only two vehicle types were tendered (one Canadian, one German). The Australian ASLAV was dismissed as embodying dated technology, insufficiently armoured, and inadequate as a New Zealand troop carrier.

3 Change in scope of the project since Cabinet approval-in-principle

The Government has not considered, nor has Cabinet specifically endorsed, the following major project changes:

- vehicle numbers (an increased requirement from 81 vehicles, first to a 152 FSV/IMV fleet, then back to 105 vehicles);

- the vehicle mix (from an original 12 fire support vehicles and 69 infantry mobility vehicles to all turreted, light armoured vehicles);

- project cost increase (from a set ceiling of $212 million to $600 million).

The vehicle numbers and vehicle mix flow directly from the Motorisation of the Army concept, based on two fully equipped battalions.

4 Changes since Tenders Review Board chose preferred vehicle

There have been changes in the project since tenders closed:

- changes in vehicle numbers/vehicle mix/specifications;

- exchange rate movement between Canadian tender (+11%) and European tender (-2%);

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- Australian purchase of a further 150 ASLAVs at a lower price to LAV III.

The disappointed second bidder, Henschel, has made representations to both the Prime Minister and you suggesting they incurred disadvantage with changes in project specifications; and that exchange rate changes have made their bid more competitive. Henschel were debriefed following tender selection and the shortcomings in their bid were identified. Nonetheless they have asked for the tender process to be investigated.

Graham Fortune
Secretary of Defence

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FOR YOUR INFORMATION

MINUTE

10000/DFD/ARMY/ARMOURED

Development Branch
HQNZDF

CDF
Sec Def

Through

DGDS 28/5
Dep Sec ~~P&P~~ endorsed (see pr)

PURCHASE OF NEW ZEALAND ARMY LIGHT ARMOURED VEHICLES

Reference:

A. Force Development Proposal (Army) New Zealand Army Light Armoured Vehicle dated 26 May 99

B. STR (99) 87 dated 11 May 99

1. Reference A is enclosed. The proposal to purchase new armoured vehicles for the NZ Army, which was included in the Minister of Defence's April motorisation paper, was endorsed at Reference B up to the allocated budget of $212.3 million.

2. It is considered that Reference A provides a sound basis upon which this project can now proceed. The endorsement of the motorisation paper at Reference B provides further impetus to the project. Staff comment has been obtained from all parties within both the NZDF and MOD.

3. OCE approval is sought to enable the tender process to proceed forthwith.

for
I.A.J. MARSHALL
Brig
AC Dev

28 May 99

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Enclosure:

1. NZ Army Lt Armd Veh FDP dated 26 May 99

Recommended:

D.W. HILL
AVM
DCDS

R. GENTLES
Mr
Dep Sec P&P

C.W. ADAMSON
AM
CDF

G. HENSLEY
Mr
Sec Def

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MINUTE

NZDF 10000/DFD/Armoured

Development Branch
HQ NZDF

1 Jun 99

Dep Sec (A)

For Information:

DCDS
CGS

ACQUISITION OF LIGHT ARMOURED VEHICLES

Reference(s):

A. CAB (98) M 10/5B(4), Armoured Vehicles, 23 Mar 98.

B. STR (99) M 12/6, Motorisation of the New Zealand Army, 12 May 99.

C. NZDF 10000/DFD/Army/Armoured, Purchase of New Zealand Army Light Armoured Vehicles, dated 28 May 99.

1. In Ref A the Government gave approval in principle for the acquisition of Fire Support Vehicles and Armoured Personnel Carriers for the New Zealand Army. Ref B approved the intention to change the concept of operations of the New Zealand Army to a motorised infantry force, and approved a change of scope to Ref A to reflect revised vehicle numbers and costs. At Ref C the Office of the Chief Executives endorsed the Force Development Proposal for a Light Armoured Vehicle capability.

2. I request that the Ministry of Defence Acquisition Division now proceed with the necessary steps to acquire the Light Armoured Vehicle capability outlined in Ref C.

I.A.J. MARSHALL
Brig
AC (Dev)
DTelN: 349-7960

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Change Pages for Army's FDP.

MINUTE

Army General Staff

Army 10001/3/10/Dev

AC Dev

For Information:

Dep Sec (A)

FORCE DEVELOPMENT PROPOSAL:
NZ ARMY LIGHT ARMOURED VEHICLES

1. Enclosed is the NZ Army Force Development Proposal (FDP) for Light Armoured Vehicles. The FDP, which is categorised as Priority One on the DCRP, has been produced in consultation with the NZDF and MOD. Neither the RNZN nor the RNZAF have a requirement for such a system.

2. It is requested that the FDP be progressed to acquire Ministerial approval-in-principle.

C.W. LILLEY
Brig
DCGS
14 Apr 99

Enclosure:

1. NZ Army Light Armoured Vehicles FDP dated 13 Apr 99

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MINUTE

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Army 10001/3/10/Dev

Development Branch
Army General Staff

EXECUTIVE SUMMARY:

FORCE DEVELOPMENT PROPOSAL FOR NEW ZEALAND ARMY LIGHT ARMOURED VEHICLES

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1. Approval in Principle is sought to proceed with the open-tender acquisition of new armoured vehicles for the NZ Army at an approximate total cost of NZ$212.3 million exclusive of GST.

General

2. The NZ Army has adopted an operational concept that confronts asymmetric threats in a non-linear battlespace. The concept relies on Infantry Mobility Vehicles (IMV) providing infantry with protected mobility, and requires that they have a protective envelope around them out to at least 2 km. By using the Direct Fire Support Weapons and the Fire Support Vehicle (FSV), all hostile forces within this envelope can be engaged and defeated.

3. In 1997, the Scorpion was withdrawn from service. The NZ Army is now without a FSV, consequently its infantry are vulnerable as they move about the battlefield. The M113A1 Armoured Personnel Carrier (APC) remains in service, but is an expensive vehicle to train on, was inadequate when deployed in Bosnia, and is now operationally obsolescent. New Zealand's APCs no longer meet the capability requirements of Army. This significantly reduces the options available to Government and is well below the capabilities required by current Employment Contexts (ECs) and outputs.

Vehicles Sought

4. The armoured vehicles needed to support the NZ Army's operational concept are:

a. an IMV capable of moving a combat equipped infantry section on the battlefield by day and night;

b. A turreted FSV with a cannon of not less than 25mm calibre able to protect the IMVs when they are mobile and to support the infantry when they are dismounted; and

c. specialist IMV variants for recovery, command, engineering and medical

5. 152 armoured vehicles are required to motorise two infantry battalions, although initial purchasing will be limited to the allocated budget of $212.3 million. Because it is not known exactly what that budget will buy, the vehicles sought are grouped by 'capability' and listed in order of priority. As many vehicles as possible will be procured within the allocated budget. Additional funding will be required for the remaining vehicles needed to motorise two battalions. The acquisition priorities are:

Ser	Priority	Vehicles	No of Veh	Capability
(a)	(b)	(c)	(d)	(e)
1	1	24	24	Two FSV companies
2	2	41	65	Three IMV companies and Battalion Tactical HQ
3	3	6	71	Engineer Platoon and Recovery Sections
4	4	13	84	Second battalion IMV company
5	5	8	92	First battalion Support Sections and remaining Battalion HQ vehicles
6	6	6	98	Second battalion Engineer Platoon and Recovery Sections
7	7	30	128	Second battalion HQ and two IMV companies
8	8	6	134	Second battalion Support Sections
9	9	12	146	Fourth Engineer and Recovery vehicles, Ambulances
10	10	6	152	'Repair and Maintenance' vehicles

Logistics

6. In terms of supply support, the NZ Army intends to minimise ownership of spares and consumables, but will hold a minimum of 30 days supply at unit level and 90 days at field level. The manufacturer will be required to provide spares within 90 days and hold a contingency 90-day pack for deployment, available at 30 days notice.

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Costs

7. The cost of procurement and introduction into service will be the $212.3 million already allocated, exclusive of GST. Operating costs initially increase by $500,00 a year as the vehicles are introduced into service, but after the transition plan is complete fall to a $250,000 decrease that eventually reduces to zero over the life of the vehicle.

C.W. LILLEY
Brig
DCGS

26 May 99

Enclosure:

1. Army 1000/3/10/Dev NZ (Army Lt Armd Veh FDP dated 26 May 99

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FORCE DEVELOPMENT PROPOSAL

NEW ZEALAND ARMY LIGHT ARMOURED VEHICLES

Army 10001/3/10/Dev

References:

A. The Shape of New Zealand's Defence - A White Paper (SONZ 97) dated Nov 97

B. Minister of Defence's Motorisation of the NZ Army Paper for the Cabinet Strategy Committee (MOD 10000/DFD/Army/Armoured) dated Apr 99

C. Secretary of Defence's Armoured Vehicle Acquisition Strategy to the Minister of Defence dated 17 Mar 99

D. Army 2005 - Army 1001/2 dated 27 Oct 98

PART I - DESCRIPTION AND ANALYSIS

Introduction

1. The NZ Army's operational doctrine, like that of its ABCA allies is based on manoeuvre warfare. This approach focuses on the ability to think, decide, then act faster than the enemy. Emphasis is placed on situational awareness, mobility, effective command and control, and protection. Infantry manoeuvre groups require protected mobility to enable them to concentrate at a decisive time and place to exploit battlefield opportunities and enemy vulnerabilities, or alternatively, to move out of harm's way. Armoured vehicles, in particular the Infantry Mobility Vehicle (IMV) and the Fire Support Vehicle (FSV) are the primary contributors to achieving the necessary protected mobility for infantry forces.

2. **Aim.** The aim of this FDP is to identify the armoured family of vehicles required to meet the New Zealand Army's need to move and protect light infantry manoeuvre groups in combat or undertaking peace support operations.

Assumptions

3. The following is assumed:

a. A battalion group will be the maximum operational commitment.

b. To achieve sustainment (with acceptable risk), a fully equipped mirror image (ie, second battalion group) is required.

c. Were a brigade required for operations, NZ would be given sufficient notice to acquire additional armoured vehicles.

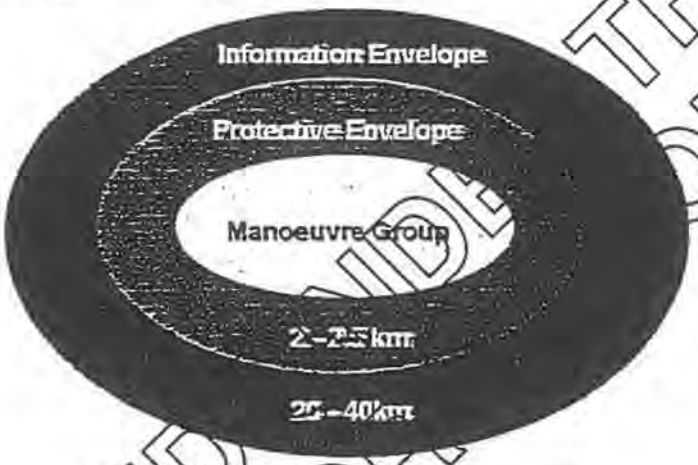
d. Training pools of vehicles will not be required if a mirror image battalion is also equipped.

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3. New Zealand's two Regular Force (RF) infantry battalions will remain in their current locations.

Concept of Operation

4. To maintain interoperability with our ABCA allies, the NZ Army has adopted an operational concept that recognises non-linear battlespace and asymmetric threats on the modern battlefield. As approved at Reference B, the NZ Army's operational forces are now based on manoeuvre groups able to operate over large and dispersed areas[1] against threats from all directions. These manoeuvre groups must be equipped to operate within the two 'envelopes' indicated in the diagram below.



NZ Army's Operational Concept

5. **Protective Envelope.** The protective envelope around the manoeuvre group has a radius between 2 and 2.5 km and is necessary for force survival. All hostile forces within this envelope must be able to be engaged and defeated. This is primarily achieved by the suite of Direct Fire Support Weapons (DFSW) and the FSV.

6. **Information Envelope.** The information envelope around the manoeuvre group has a radius between 20 and 40 km. All forces within this envelope must be able to be detected in sufficient time for the friendly force commander to react.

Vehicles Sought

7. To achieve the operational concept described, the NZ Army has the option of either mechanising or motorising its force. Reference B has endorsed the motorised option.

8. Motorised forces require three types of light armoured vehicles. These are:

a. an IMV capable of moving a combat equipped infantry section on the battlefield by day and night as part of the manoeuvre group;

b. an FSV able to protect the IMVs when they are mobile and to support the infantry when they are dismounted as part of the protective envelope; and

[1] The motorised Kiwi company in Bosnia was responsible for an area 150 x 50 km, whereas a Fijian infantry [illegible] allocated an area only 20 x 20 km.

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specialist IMV variants for recovery, command, engineering and medical evacuation.

Wheels Versus Tracks. Reference B discusses the various types of armoured vehicles available in tracked and wheeled configurations and concludes that some are inappropriate for the NZ Army. In particular, it highlights the inadequacies of armoured trucks in terms of axle weights and armour[2], and excludes them from further consideration. It compares wheeled IMVs against tracked Armoured Personnel Carriers (APC) and concludes that wheeled IMVs offer significant advantages in self-deployment, growth potential, serviceability and operating costs. Reference B notes IMV advantages in soldier effectiveness, training costs and environmental damage, and acknowledges the constraints imposed by the existing home locations of the two infantry battalions. Overall, Reference B concludes that a wheeled vehicle is the preferred option for motorising the NZ Army. Reference B has been endorsed by Cabinet.

Current Armoured Capability

10. **Scorpion.** 26 Scorpions entered service in 1983 as expedient tank trainers to replace the M41 Walker Bulldog light tank. These vehicles were re-roled in 1985 to become reconnaissance vehicles and FSVs. Because the Scorpion was produced for the European theatre, it did not always perform well in New Zealand's rugged terrain. Furthermore, because it lacked a modern night-capable fire control system, the vehicle was not well suited for the fire support role. In 1997, the Scorpion was withdrawn from service. The NZ Army now has no FSV, consequently its infantry are more vulnerable as they move about the battlefield.

11. **M113A1 APC.** In the late 1960s, the NZ Army procured the M113A1 APC to provide protection and mobility to its infantry. Although versatile and reliable at that time, 30 years on the M113A1 no longer has sufficient protection, mobility or firepower to operate effectively on the modern battlefield. Furthermore, because the vehicle is tracked, it has proven expensive to run and maintain[3], and continues to impose training limitations on the Army as a whole.[4] The M113A1 APCs that deployed to Bosnia in 1995 underwent major modifications to achieve minimum acceptable levels of protection, but in doing so, their mobility was severely compromised, which in turn imposed operational limitations on the New Zealand force. Furthermore, the fire control system fitted to the APC was rudimentary and, in any operation demanding 24 hour, all-weather precision remains inadequate. The M113A1 is an expensive vehicle to train on, has no night capability and is operationally obsolescent. Although the remaining 78 M113A1 APCs could be upgraded, they do not comply with Reference B and as an option, the upgrade of the current fleet is excluded.

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[2] This was also the conclusion reached by the combined NZ Army/MOD mobility study in November 1998 where it was determined that a 14.5mm protected vehicle could be successfully employed in over sixteen times the tasks a 7.62mm protected vehicle might undertake.

[3] Over a nine month review of costs from Jul 96 to Mar 97, M113A1 operating costs (comprising spares, repair labour and fuel) were $23.94 a mile (or $14.88 a km).

[4] Tracked vehicles are based in Waiouru, therefore training must be conducted there rather than in other

Capability Gap

12. The current operational concept requires protected mobility for the infantry, plus a FSV. The M113A1 can no longer provide adequate levels of protected mobility and there is no FSV. The NZ Army can no longer meet battalion level outputs requiring protected mobility.

Risk

13. **Employment Options.** Without FSVs and IMVs to provide protected mobility, employment options for light infantry are limited to benign threat environments. This significantly reduces the options available to Government and is well below the capabilities required by current Employment Contexts (ECs) and outputs.

Limitations and Constraints

14. It is essential that future armoured vehicles are interoperable with our ABCA allies, in particular Australia. It is also essential that armoured vehicles are of proven technology and able to be upgraded.[5] Therefore, it is highly desirable that NZ acquires a vehicle with major components that are of proven technology preferably in service with an ABCA army.

PART II - CAPABILITY REQUIREMENT

Functional Capabilities

15. The functional capabilities required of the family of armoured vehicles are:

a. **Mobility.** To provide infantry elements with cross-country battlefield mobility and operational mobility over longer distances using roads and tracks.

b. **Firepower.** To provide mobile 24 hour close direct fire support to mounted and dismounted infantry regardless of weather conditions.

c. **Protection.** To provide 7.62mm all-round protection that can be increased to 14.5mm all-round protection as an applique feature. The vehicles must also protect the occupants against injury from anti-personnel mines and 155mm artillery HE detonations 15 metres from the vehicle.

d. **Command.** To provide the necessary communications, navigation aid and command post facilities to command and control manoeuvre elements when mobile.

e. **Supporting Elements.** To provide artillery and mortar observation parties or any of the NZ Army's infantry crew served weapon systems with protected mobility.

[5] Developments in the future may include emerging technologies and information systems associated with the Revolution in Military Affairs (RMA). Upgrades might therefore include digitisation, Identification Friend or Foe (IFF) systems, improved situational awareness, enhanced communications, or as yet undefined armour [illegible] developments. Upgrade potential is recognised by vehicle weight redundancy.

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Engineering Support. To facilitate minor earthworks, obstacle clearance and counter mobility tasks.

Recovery. To extricate and recover other armoured vehicles that are broken-down, bogged in soft terrain or casualties of enemy action.

Casualty Evacuation. To evacuate casualties.

Logistics. To carry sufficient food, water and ammunition to meet the needs of their passengers for two days.

Vehicle Variants

16. To fulfil the broad range of functional capabilities required of armoured vehicles, a single family of vehicles is required with the following variants:

a. **IMV.** The IMV will be a turret-less armoured vehicle that can accommodate a two-man crew and seven passengers. The vehicle's primary weapon will be a .50 calibre machine gun, with a secondary mount provided for a 7.62 or 5.56mm machine gun. Occupants will dismount from the vehicle to fight.

b. **FSV.** The FSV will be an armoured vehicle fitted with a two-man turret. The turret will house a cannon of calibre no smaller than 25mm[6] able to provide close fire support to mounted and dismounted manoeuvre elements. The FSV is to accommodate a three-man crew and up to four 'occasional' passengers. It is to be able to provide accurate fire support from a static position and when moving.

c. **Command-Post Vehicle (IMV-C).** The IMV-C is to be internally configured for command post operations accommodating a crew of two, three command post operators and three other passengers.

Recovery Vehicle (IMV-R). The IMV-R is to accommodate a two-man crew and a winch suitable for recovering armoured vehicles. The IMV-R is to also have a lifting hoist suitable for Main Support Item[7] exchanges in secure rear areas.

e. **Engineer Vehicle (IMV-E).** The IMV-E is to be fitted with a front-mounted hydraulic 'dozer' blade. The IMV-E is to be able to accommodate two crew and seven combat laden personnel.

17. The NZ Army's armoured vehicles are to be a single family of vehicles. It is highly desirable that all variants are derived from the FSV.[8] Essential and desirable features of the FSV, the IMV and its variants are at Annex A.

Vehicle Configuration

18. The NZ Army has two requirements that influence the suitability of some wheeled IMV configurations. These are:

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[6] It is essential that this cannon be in service within ABCA countries on like vehicles. Australia, Canada and the US all use a M242 Bushmaster chain gun, and this is the preferred solution for NZ.

[7] This would include engines, gearboxes and other heavy equipment.

[8] It is desirable that the variants are derived from the FSV as it is possible that NZ might, in the future, wish to

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Mine Damage. One of the major threats NZ soldiers have faced over the last decade has been mines. The armoured vehicle that the NZ Army acquires must be able to survive serious mine damage and still be able to drive. Because sizes and shapes of mines produce an almost endless array of characteristics, this requirement is not expressed in terms of explosive content, but rather in terms of effect. The NZ Army's armoured vehicle must be able to extricate itself from immediate danger[9] after losing the function[10] of two adjacent or opposite wheels to mine damage.

Axle Loading. The Gross Vehicle Mass (GVM) of the vehicle, less applique armour, is to conform with NZ road regulations.[11] Axle loadings, with 14.5mm applique armour fitted, must remain within the manufacturer's limitations for the vehicle. Axle loadings for combat laden vehicles, with applique armour fitted, must not exceed RNZAF C130 limitations.[12]

Number of Vehicles

19. Annex B identifies the 152 armoured vehicles required to motorise two infantry battalions. Because Reference C indicates initial purchasing will be limited to the allocated budget of $212.3 million, the vehicles sought are grouped by 'capability' and listed in order of priority. It is anticipated that the allocated budget will obtain somewhere between 84 and 98 vehicles, thereby providing an operational battalion with some sustainment. Additional funding will be required to motorise the second battalion group. This will be subject to a further FDR.

20. A minimum of 84 vehicles, in accordance with the priorities identified at Annex B, are required to deploy and sustain an initial battalion group, but are not sufficient to rotate that group. The variant priorities at Annex B are based on providing both battalions with a complete FSV company, one battalion with sufficient vehicles to lift its three rifle companies, and the second battalion with a single rifle company lift. Under such a distribution, the second battalion could sustain the first, but could not be rotated as a battalion.

Transition To Motorisation

21. **Maintaining Infantry Battalion Outputs.** With the introduction into service of the new vehicle, there is still a requirement to maintain current outputs. This is the subject of a separate paper. The transition period is anticipated to be five years.

22. **Fourth Rifle Company.** The DA 97 identified the requirement for each infantry battalion to be enhanced by the addition of a fourth rifle company. Although motorisation sees the number of rifle (manoeuvre) companies remaining at three, the battalion numbers as a whole remain the same. This is due to an enhanced support

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[9] From immediate danger should be interpreted as being into an area of dead ground out of observation and direct fire, not more than one kilometre from the minefield.

[10] 'Losing the function of' relates to the physical loss of a wheel, or the loss of one or a combination of drive, steering, or laden load support functions.

[11] Land Transport safety Authority regulations restrict steering axle weights to 5,400kg.

[12] The maximum single axle floor-loading limit of the RNZAF C130 is 13,000 pounds, or approximately

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ompany with the introduction of additional direct fire support weapons, an enhanced econnaissance company with the introduction of the surveillance vehicle plus the addition f a company of fire support vehicles. A paper that seeks endorsement of the detailed tructure of the motorised battalion is currently being prepared. A fourth rifle company will till be required for the second battalion until it is motorised.

23. **QAMR.** Upon the two motorised battalions being declared operational, QAMR will no longer be required to maintain its APC capability. These will have been embedded in the motorised battalions. A Reconnaissance, Intelligence, Surveillance and Target Acquisition (RISTA) concept for motorised operations is currently being developed as part of the 'Reconnaissance Vehicle' FDP. This concept will identify the levels of RISTA capability to be retained within the NZ Army, where these should reside, which will in turn determine the future of QAMR.

24. **Two Tranche Buy.** Reference B acknowledged the need to motorise both the infantry battalions but only endorsed funding up to $212.3 million. This fiscal envelope is unlikely to realise more than two fire support companies and four infantry companies worth of vehicles. A second tranche will be required. Figures in this FDP relate to the first tranche as determined by the fiscal envelope.

PART III – PROCUREMENT

Acquisition Strategy

25. Reference C explains the acquisition strategy recommended by the MOD and approved by the Minister, it indicates:

a. The full motorisation of two battalions will involve 152 vehicles and cost in the order of $400 million. That cannot occur immediately as it is unaffordable in the current economic climate.

b. The project has an allocation of $212.3 million already approved and is to use it to purchase as many vehicles as possible in the first of what will become a two phased acquisition.

c. There is no operational imperative that justifies sole sourcing.

d. A competitive tender is the normal and preferred acquisition strategy.

26. **Timeframe.** Given the current status of the NZ Army's armoured vehicles, new armoured vehicles should be obtained as soon as possible. A likely acquisition timeframe is:

a.	Jul 99 -Aug 99:	Tenders submitted.
b.	Sep 99 - Oct 99:	Evaluation of Tenders.
c.	Oct 99 - Nov 99:	Contract negotiation/Cabinet Approval-to-Commit.
d.	Dec 99 - Feb 00:	Delivery of initial training vehicles (if available).
e.	Jul 00:	Initial training vehicles enter service.

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Nov 00 - Sep 02: Delivery of full fleet and introduction into service.

Closer Defence Relations

27. **Status of ASLAV.** ASLAV is an eight-wheeled armoured reconnaissance vehicle that has been, and still is being modified by Australia to improve its effectiveness in Northern Australia. 111 vehicles of varying types have already been acquired and introduced into service with the Australian Army over the last eight years. A further 150 vehicles are sought over the next four years, all of which will have considerable Australian manufacturing input. These are expected to be produced at a rate of one a week.

28. **Suitability of ASLAV for NZ.** ASLAV is a second generation wheeled armoured vehicle that is no longer produced outside Australia. It is a good reconnaissance vehicle and has been modified specifically for operations in Northern Australia. However, it is not necessarily a good 'general purpose' IMV. Furthermore, because ASLAV is of an old design, it has reached its maximum performance and has no upgrade path into the future. It is armoured to defeat 7.62mm ammunition but would need to be lightened to accommodate applique armour. With applique armour fitted, the ASLAV is slightly over the manufacturer's recommended GVM.

29. **Feasibility of Joint Acquisition.** References B and C conclude ASLAV does not meet NZ's growth and protection requirements, therefore a joint acquisition is not recommended.

30. **Interoperability.** Although this means NZ will not acquire ASLAV, it will acquire a modern wheeled armoured vehicle (desirably in service with an ABCA ally). With such a vehicle, there is little doubt that NZ will still be able to operate with Australia, and every chance that the vehicle selected by NZ will be more 'general purpose' than that developed by the Australians. That characteristic could result in NZ achieving strengths where Australian weaknesses exist, thereby creating synergy between the two countries in this area, ie the NZ wheeled motorised capability compliments the Australians wheeled reconnaissance capability. A non-ASLAV armoured vehicle does not threaten interoperability with the Australians.

Acquisition Priorities

31. The financial constraints of Reference C make it difficult to accurately predict exactly how many armoured vehicles will be acquired in the first phase, consequently Annex B indicates acquisition priorities by variant. Annex B is based on the following methodology:

a. All the FSVs should be sought in a single group to ensure they all have the same build standard.[13]

[13] Although it is desirable to purchase all of any particular variant from a single production run, it is essential that the FSV is acquired in this way as it alone has a complete sub-assembly (the turret) that could be manufactured by a third party. The turret could then be fitted with an integrated suite of equipment (sensors, optics, fire control systems etc) from still more manufacturers. The technical risk is increased substantially if the FSVs are not purchased as a single 'lot'. The IMVs are not exposed to the same risks given their relative

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The FSVs should be the highest priority as the Scorpion has already been withdrawn from service and the close fire support skills are being lost.

The IMV priority is to motorise a battalion group.

There is then a requirement to sustain that battalion for its deployment.

IMVs should be then be obtained to motorise the second battalion.

There is then a requirement to have enough vehicles to provide fleet whole of life sustainment.

32. Summarised, the acquisition priorities are tabled below. Where funding remains after a complete 'capability' has been acquired, Repair and Maintenance vehicles can be obtained in whatever quantity can be obtained within the allocated budget.

Ser	Priority	Vehicles	No of Veh	Capability
(a)	(b)	(c)	(d)	(e)
1	1	24	24	Two FSV companies
2	2	41	65	Three IMV companies and Battalion Tactical HQ
3	3	6	71	Engineer Platoon and Recovery Sections
4	5	13	84	Second battalion IMV company
5	4	8	92	First battalion Support Sections and remaining Battalion HQ vehicles
6	6	6	98	Second battalion Engineer Platoon and Recovery Sections
7	7	30	128	Second battalion HQ and two IMV companies
8	8	6	134	Second battalion Support Sections
9	9	12	146	Fourth Engineer and Recovery vehicles, Ambulances
10	10	6	152	'Repair and Maintenance' vehicles

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PART IV - COSTS

nitial Costs.

33. Indicative costs associated with one manufacturer's Rough Order of Magnitude (ROM) pricing[14] are summarised below:

Ser	Vehicles	Cost	Remarks
(a)	(b)	(c)	(d)
1	24 FSVs and 60 IMVs	$185.32 million	IMVs include IMV-C, IMV-E and IMV-R
2	One battalion of appliqué armour	$3.90 million	Includes wheel skirts for FSVs
3	ILS	$7.06 million	Includes training aids, simulators, courses, spares, publications and specialist tools
4	25mm Ammo	$4.22 million	Includes two years training round ammunition (@$360,000) and $3.5 million operational round CRS ($243,600 of which is also used in training each year)
5	Project Management	$1.80 million	
6	Infrastructure	$10.00 million	
	Total	**$212.30 million**	

Operating Costs

34. The new light armoured vehicles will be operated differently to the current fleet. The M113s are expensive to maintain per track mile, but their mileage is low. The new vehicles are far less expensive to maintain[15], but will travel greater distances.[16] Operating costs for wheeled vehicles are based on Canadian Army estimates for the Generation 3 LAV, which were derived from manufacturer's predictions and their experience with Generation 2 vehicles. Because the transition plan assumes the retention of M113s for up to five years, initially, overall armoured vehicle operating costs are very

[14] Indicative pricing is based on Feb 99 ROM pricing provided by DDGM (Diesel Division General Motors) of Canada for Generation 3 Light Armoured Vehicles (LAV III).

[15] Comparative running costs are $5.78 versus $2.98 for tracked vehicles as typified by the M113A4 and wheeled vehicles as typified by the Canadian LAV III.

[16] M113 use was 3,000 km annually, wheeled armoured vehicle use is based on 5,000 km annually (of which

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high (peaking at $733,000). But, as M113 use is reduced (to half their current operating once the first of the new vehicles arrive) and DA funding is allocated, those costs reduce significantly (to under $476,000). After the M113s are withdrawn, operating costs then fall to some $200,000 below allocated funding.

Summary of Capital Investment and Cash Flow Prediction

35. The capital investment is $212.3 million, which is likely to occur over three years at $85.4 million[17], $47.7 million[18] and $76.7 million if training FSVs are able to be obtained before the IMVs are manufactured.

Capital Funding Requirement

36. The Capital Funding requirement is $212.3 million.

Life of Proposed Equipment

37. The proposed Life of Type (LOT) is 25 years.

PART V – ASSOCIATED SUPPORT MATTERS

International Collaboration

38. Because the NZ Army seeks a general purpose armoured vehicle, it is likely that it will procure a military 'off-the-shelf' capability. The manufacturer of that vehicle will utilise NZ industry for much of its repair, particularly base/depot repair. It is unlikely any scope exists for international industrial collaboration in manufacture or assembly.

Consultation Within the NZDF

39. Army is the only service requiring armoured vehicles. In order to retain the capability for combined and joint operations, all variants of the armoured family of vehicles need to be transportable in New Zealand transport aircraft[19] (particularly the C130 Hercules) and Australian and New Zealand military sealift ships (particularly the HMNZS CHARLES UPHAM and HMAS TOBRUK).

Integrated Logistic Support (ILS)

40. An Integrated Logistics Support (ILS) system is essential for maintaining serviceability of the armoured family of vehicles throughout their LOT. The armoured vehicle selected for the NZ Army is to have full ILS integration included in its development and come complete with codification and technical data packages.

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[17] FSVs with armoured kits and wheel skirts, training aids, specialist tools, spares, ammo CRS, most of the project management costs and one quarter of the infrastructure.

[18] Two companies of IMVs, additional spares, half the remaining project management and most of the infrastructure.

[19] Although the Army would not normally utilise aircraft to move large numbers of armoured vehicles, the urgent airlift of small numbers of replacement vehicles could be necessary in an operation.

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41. **Supply Support.** In terms of supply support, the NZ Army intends to minimise ownership of spares and consumables, and will hold 30 days supply at unit level and 90 days at field level. The manufacturer will be expected to guarantee availability of parts within 90 days. The manufacturer would be required to hold a contingency 90-day pack for deployment, which would be available at 30 days notice. The manufacturer would retain ownership of all other inventory items under an agreed contractual arrangement, which would come into force once all the vehicles were in NZ.

42. **Repair.** Repair will remain in accordance with existing levels of repair, and will be conducted in the main at Linton. The infantry battalion's first line repair will be based on detachments of the parent workshop, who will also deploy with the battalion if it were to undertake operations. Civil agencies will undertake all base repair, and could, where it proved cost-effective, even undertake some second line repair. In general, operators will be restricted to visual inspections and the use of built-in test equipment (BITE) to diagnose faults. Workshop personnel equipped with some test equipment will then exchange defective components or modules. Repair of the defective equipment will be contracted to a civilian agency.

43. **Infrastructure.** It is proposed that Army retain project finance for infrastructure, and that facilities and infrastructure needed to support the selected armoured vehicle are addressed in detail through the MFDP (Minor Force Development Proposal) process once actual requirements are known. Infrastructure will only be funded from the armoured vehicle project where a direct need can be immediately traced to the introduction of armoured vehicles. $10 million has been allocated from within the project's $212 million budget for this to occur. Anticipated infrastructure requirements are at Annex C and include:

a. **Vehicle Hangars.** All vehicles will require some form of shelter, and it is quite possible that the FSVs (with their extensive electronics and expensive optics) may require fully enclosed hangars. A consultant is being used to report on this requirement in time for design briefs to be finalised by Sep 99.

b. **Workshop Extensions.** 2 Field Workshop will require extensions to enable them to repair armoured vehicles. Those extensions will be completed in coordination with the Light Operational Vehicle (LOV) requirements, with costs apportioned to each project as appropriate.

c. **Hardstanding.** Maintenance areas will be required within battalion lines for the armoured vehicles.

44. Further ILS detail is at Annex C.

Personnel, Training and Simulation

45. **Personnel.** The introduction of a new family of armoured vehicles was fundamental to the recent Army restructuring at Reference D. Battalion establishments in Army 2005 are subsequently based on the nine man rifle sections motorised in IMVs. A cannon may generate a need for a new trade to maintain the fire control systems in the FSV, but at present the strategy is to upskill existing technicians as necessary. In summary:

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a. **Combatant Staffing.** New armoured vehicles will not require an increase in personnel in order to operate the vehicle or weapon systems. QAMR personnel will be absorbed into the two RF infantry battalions. Training will occur at the Land Operations training Centre in Waiouru.

b. **Technician Staffing.** The current establishment of armourers, electronic technicians and ammunition technicians is sufficient to cater for maintenance and repair of the IMVs and FSVs, but may need to be supplemented by additional tradesmen to maintain the fire control systems in the FSVs. The armoured vehicles eventually selected will determine whether a new trade is created or an existing trade expanded. Technician training will occur at the Trade Training School in Trentham.

Training. Operator and technical training will be required. The manufacturer will be required to provide initial instructor and technical training on the vehicles. The development and delivery of on-going training will be the responsibility of the appropriate NZ Army training establishment. The manufacturer will be expected to provide some on-site field support throughout the first two years of vehicle introduction.

47. **Simulation Equipment.** The manufacturer will be required to offer a comprehensive suite of training aids. These will include: computer graphics, some of which will be animated; wall charts; cutaway components; training boards; and life-size simulation aids such as powered turret stands, sub-calibre simulators and turret crew trainers. Although largely dependent on what the manufacturer of the vehicle actually offers, the simulation strategy seeks a live firing simulator in which a crew can train, desirably in a virtual environment populated by other crews. FSV simulation may take the form of fixed facilities in Linton and Burnham, or most preferably, if the manfacturer offers such a system, utilise actual vehicles as simulators by attaching sensors and cameras to the fire control system and optics. Such simulation equipment would be readily transportable within NZ and into a theatre of operations. Laser equipment is being obtained outside this project[20] to support field training with real equipment.

48. **Live-Firing Facilities.** Waiouru will be the centre-of-excellence for live-firing and will eventually see the construction of an all-natures live-firing facility suitable for moving armoured vehicles and dismounted groups of infantry to engage moving targets. That range will be funded outside this project, therefore, until it is built, live-firing in Waiouru will be restricted to field firing at static targets using training and operational rounds from moving and static vehicles.

Command, Control Communications and Information Systems

49. Tactical communications equipment will be fitted to each vehicle in accordance with the motorised battalion requirements already staffed within the Army's TMCS (Tactical Mobile Communications System) project.[21] Radios fitted to the vehicle will not be removed from the vehicle if the infantry occupants dismount to conduct a mission.

[20] The Battlefield Training System is funded in FY 03/04 at $2.1 million.

[21] Any additional radios required for the second tranche of vehicles will be included in a second phase of that project, or the new FDP. The current TMCS project will not acquire radios beyond Army's immediate requirements.

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Internal communication harness equipment[23] is included in the project costing, and will include crew headsets.

50. It is Army's intention to follow current ABCA trends of digitisation and integration of C⁴I systems such as the procurement of an IFF system for its armoured vehicles. Possession of such systems will improve interoperability, target identification, response times, and reduce the potential for fracticide. This provision is not costed within this FDP, however the acquired vehicles should be capable of being upgraded as the process of digitisation matures.

Health, Environment and Safety

51. NZ regulations relating to the movement of personnel in vehicles are to be met by all providers, particularly those associated with stowage and seating.

52. It is desirable that the legal requirements of NZ Transport legislation and the NZ Land Transport Safety Authority (LTSA) are met as exemptions may be difficult to obtain.

Quality Assurance (QA)

53. The project manager will be required to ensure appropriate quality assurance standards are detailed in a QA plan.

Project Management Costs

54. $1.8 million has been allocated for MOD project management costs for this project.

Acquisition Management

55. The Ministry of Defence will be responsible for the acquisition of the armoured family of vehicles including the development of the Acquisition Strategy.

Scope for NZ Industry Participation (NZIP)

56. There will be considerable scope for NZ industrial participation in base repair throughout the life of this vehicle. Manufacturers will be expected to maximise the use of NZ contractors wherever possible. This may include the repair of defective modules or components. Possibilities exist, in the medium term, to have NZ industry develop situational awareness equipment, add-on armour, wheel skirts and other accessories. The short acquisition timeframe largely precludes involvement in the base vehicle itself.

Standardisation and Interoperability

57. In order to maximise standardisation and interoperability with allies, the NZ Army should procure a system which is in service with, or committed to be procured by an

[23] Active Noise Reduction will be incorporated into all crew equipment and at least the headset of the infantry section commander to minimise the noise levels inflicted on the individuals and ensure the rapid passage of tactical information and orders.

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ABCA nation. There may be scope for joint New Zealand–Australian activities, such as urret and commander training, or purchases of cannon ammunition.

Superseded Equipment

58. The Scorpions will be disposed of as quickly as possible, if necessary using a private consultant and an incentive package to achieve a rapid sale at a good price. The disposal of the M113 will not occur until the new armoured vehicles are fully introduced into service.

Relationship to Other Army Projects

59. Although other Army projects meet specific separate requirements, linkages exist in the following areas:

a. **Light Operational Vehicle Project.** The LOV project is functionally linked to the mobility requirement of the IMV and FSV particularly the manoeuvring of the support weapons platforms alongside the armoured vehicles. The mobility criteria of the LOV must be comparable to that of the IMV and FSV. The final LOV numbers are dependent on the actual numbers of IMVs acquired in this project.

b. **Tactical Mobile Communications System (TMCS) Project.** The TMCS project has allowed for 24 HF and 140 VHF radios and associated mounts and antennas.

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PART VII - DATA SUMMARY

Short Title: Armoured Vehicle Project

Start of Funding: FY 99/00

Project Funding: $212.3 million

Costing Base Data: February 1999

Rates of Exchange: Canadian Dollars 0.8223

Costing Data:

a.	Life of Proposal:	25 years
b.	Proposed Capital Funding:	$212.3 million
c.	Disposal Value of equipment being replaced:	$1.25 million
d.	Change in Annual Operating Costs:	-$0.2 million[23]

Fixed asset Register Data:

FY of addition: 99/00[24]

Value: $85.4 million

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DCGS

26 May 99

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[23] After M113s are withdrawn from service.
[24] If training FSVs are able to be obtained before the main production run of vehicles

Annexes:

A. Outline User Specifications
B. Variant Priorities
C. ILS
D. Capital Project Financial Summary

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ANNEX A TO
ARMD VEH FDP
DATED26MAY 99

OUTLINE USER SPECIFICATIONS

LIGHT ARMOURED FAMILY OF VEHICLES (FOV)[1]

1. **General Description.** The FOV shall be based on wheeled armoured vehicles able to protect occupants from anti-personnel mines and machine gun fire up to 14.5mm. The FOV shall be able to move quickly and reliably over roads, tracks and cross-country.

2. **Mission Profile.** The Mission Profile identifies the tasks, events, duration, operating conditions and environments that the FOV will experience during battlefield missions and training. It is anticipated the FOV may undertake battlefield missions up to one year in every five over their 25 year Life of Type.

a. **Battlefield Mission.**[2] The FOV shall have a 0.95 probability of completing a battlefield day as outlined in the table below.

Ser	Activity	Time (Hrs)
(a)	(b)	(c)
1	Driving 160 km on roads @ 50-80kmph 90 Km on tracks @ 50 kmph 86 km x-country @ 5-50 kmph	9.95
2	Idling Low 3.25 hr High 4.0 hr	7.25
3	Interior Lights Ventilator/Respirator system NBC sensors Navigation system Night vision sights Communications (transmitting not to exceed 1/8 of use)	Continuously Continuously Continuously Continuously 8.0 Continuously
4	Crew maintenance maximum	1.0

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[1] The criteria that follow apply to all variants within the FOV unless otherwise specified in the text or variant matrix.

[2] These figures are derived from Canadian Army operational experience with similar wheeled armoured vehicles

b. **Training Mission Profile.** It is anticipated that training will be based on up to 5,000 km per year. A typical training day is outlined in the table below.

Ser	Activity	Time (Hrs)
(a)	(b)	(c)
1	Driving 70 km on highway @ 80-100 kmph 10 km on roads @ 30-50kmph 55 km on tracks @ 30-40 kmph 28 km x-country @ 5-50 kmph	8.5
2	Idling Low 3.0 hr High 4.0 hr	6.75
3	Interior Lights Ventilator/Respirator system NBC sensors Navigation system Night vision sights Communications (transmitting not to exceed 1/8 of use)	Continuously Continuously Continuously Continuously 8.0 Continuously
4	Crew maintenance maximum	1.0

c. **Climatic Conditions.** The FOV shall be able to operate in the following climatic conditions (as defined in QSTAG 360):

(1) **A2 - Intermediate Hot Dry.** Areas which experience high temperatures accompanied by high levels of solar radiation and moderately low relative humidity, eg the Australian Continent and South Central Asia.

(3) **B2 - Wet Warm/Wet Hot.** Areas which experience moderately high temperatures accompanied by continuous very high relative humidity. These conditions are found in rain forests and other tropical regions during periods of continuous cloud cover, where direct solar radiation is not a significant factor. Geographical regions covered include South East Asia, Indonesia and the North East Coast of Australia.

(4) **B3 - Humid Hot Coastal Desert.** Areas which experience moderately high temperatures accompanied by high water vapour content in the air near the ground, in addition to high levels of solar radiation. These conditions occur in hot areas near large expanses of water.

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(5) **C0 - Mild Cold.** Areas which experience moderately low temperatures such as the coastal areas under prevailing maritime influence, including Southeast Australia and the lowlands of New Zealand.

(6) **C1 - Intermediate Cold.** Areas which experience moderately low temperatures such as central Europe.

ESSENTIAL CRITERIA

3. **Mobility.** The following are the minimum FOV mobility requirements:

a. Required combat laden level road performance is as follows:

(1)	Road Speed	>90 km/h
(2)	Range	>450km
(3)	Maximum turning radius	<12.5 metres
(4)	Acceleration 0-40 kmph	<10 seconds
(5)	Stopping Distance from 30 kmph	<7 metres

b. The minimum mobility parameters when fully laden are as follows:

(1)	Step height	>0.5 metres
(2)	Gradient	>60%
(3)	Side slope (halted and mobile)	>30%
(4)	Trench gap	>1.5 metres
(5)	Fording depth without preparation	>1 metre
(6)	Ground clearance	>0.4 metres

c. The FOV shall retain limited mobility when they have lost the function (drive, steering or laden support) of two opposite or adjacent wheels with minimal crew action.

d. The FOV shall have a central tyre inflation system and run-flat tyres. They shall be equipped with automatic transmissions, power steering and ABS brakes.

4. **Deployability.** Any fully laden vehicle in the FOV shall:

a. Be air-portable in a C-130H[3] with crew preparation only.

b. Be transportable by sea with crew preparation only.

[3] Total laden vehicle weight shall not exceed 20,400 kg. Single axle weight shall not exceed 5,900kg.

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5. **Protection.** The following shall be the minimum essential levels of active and passive protection:

a **Active.** The following active measures are to be incorporated:

(1) **Multi Barrel Smoke Grenade Dischargers (MBSGD).** The system shall provide full screening of the vehicle in less than 10 seconds.

(2) **Automatic Fire Detection and Suppression System (AFDSS).** An AFDSS shall be fitted to reduce casualties and equipment damage. AFDSS shall be available in both the passenger and engine compartments.

b. **Passive.**

(1) The vehicle silhouette is to be as low as possible.

(2) Electronic emissions shall be as low as possible.

(3) Thermal, acoustic and IR signatures shall be as low as possible.

(4) The FOV hull shall provide all-round protection (at zero degrees point blank range) from small arms fire up to 7.62mm ball. That protection shall be able to be enhanced to 14.5mm AP (at zero degrees from 500m) all-round protection by the use of applique or other add-on armour.

(5) Anti-spall liners shall be fitted to all vehicles.

(6) Armoured wheel-skirts shall be able to be fitted to deployable FSVs.

(7) Occupants shall be protected against anti-personnel mines and have ballistically protected seating.

(8) Occupants shall be protected against blast and splinters from 155 mm HE artillery rounds exploding 15 metres from the vehicle.

(9) All viewing devices shall be laser safe.

6. **Firepower.** The FSV shall:

a. Have a 2-man electrically driven turret armed with a stabilised cannon of at least 25mm and a co-axial 7.62mm machine gun.

b. Have ready access to 200 rounds of cannon ammunition and 400 rounds of 7.62mm ammunition.

c. Provide the commander and gunner with day sights and a shared thermal night sight with integrated eye-safe laser range finder.

d. A turret mount for a 'secondary' 7.62mm or 5.56 mm section machine gun.

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7. **FSV Weapon.** The primary weapon on the FSV is to be a cannon of at least 25mm. It is essential that this cannon is in service within ABCA countries on like vehicles. Australia, Canada and the US all use the M242 Bushmaster automatic cannon and this is the preferred solution for NZ. The weapon system shall be 24 hour, all-weather capable, and be able to perform the following functions when static and moving:

a. Acquire targets out to at least 5,000m.

b. Recognise targets out to at least 3,000m.

c. Identify targets out to at least 2,500m.

d. Neutralise targets[4] out to at least 2,000m.

8. **Other Essential Features.**

a. **Capacity.** Variants of the FOV shall carry all the combat supplies needed to undertake a mission. For IMVs, this shall include a minimum of: 1200 rounds of .50 calibre ammunition; 4,100 rounds of 5.56mm ammunition; 1,440 rounds of 7.62mm ammunition; 40 litres of water in jerricans and 40 litres of fuel in jerricans.

b. **Access.** The FOV shall allow personnel easy access to and from the vehicle by way of a rear ramp or twin doors (also at the rear) without a central pillar.

c. **Hatches.** The FOV, less the FSV, shall have two forward hatches for the vehicle commander and section commander. At least one rear hatch shall be provided for other occupants.

d. **Fuel Type.** The FOV shall be diesel powered with the fuel tanks external to the passenger compartment.

e. **Navigation.** The FOV shall be supplied with an integral global positioning system (GPS) which complies with the requirements detailed in the Tactical Mobile Communications Systems FDP.

f. **STANO.** All armoured vehicles shall be fitted with Generation III image intensification night vision devices for their crews.

g. **Situational Awareness System.** The FOV, less the IMV-R, shall be fitted with a system which provides situational awareness to the mounted infantry section.

h. **Road Weight Restrictions.** The FOV shall not exceed NZ road weight limits of 6 tonnes per axle when combat laden with a 5,000 kg payload. Steering axles shall not exceed 5,400 kg.

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[4] Targets will include dismounted infantry, infantry strong points, 'B' vehicles and light armoured vehicles (as characterised by the BTR-80 without add-on armour).

h. **Occupational Health and Safety Regulations (OSH).** The FOV shall conform with NZ OSH regulations regarding occupant safety in vehicles.

i. **Recovery Points.** The FOV shall be fitted with standard equipment interfaces for recovery.

j. **Electrical System.** The electrical system shall be 24V DC with the capacity to operate all ancillary equipment for a minimum period of 4 hours silent watch and still have sufficient energy to start the vehicle engine. The electrical system shall use military standard wiring, connectors and breakers. It shall be suppressed to prevent radio interference. The battery charging systems shall be compatible with gel type sealed lead acid batteries.

k. **Vehicle Operation.** The FOV shall be capable of being stopped, then restarted on the maximum gradient in both directions.

l. **Environmental Control.** Air conditioning shall be provided to the crew and passenger compartment for heating and cooling.

m. **Self-Recovery.** The FOV, less the MV-R, shall be fitted with a self-recovery winch able to be deployed to both the front and rear of the vehicle.

n. **Built In Test (BIT).** The FOV shall have BIT for all systems, able to indicate faults.

o. **Laser Warning System (LWS).** The FOV shall be fitted with a LWS.

p. **Communications Systems.** The FOV shall have an internal communications system that allows the crew and infantry commander to communicate with each other. That system is to be linked to the radio communications suite and include an external connector that allows a user outside the vehicle to access the communications system. All vehicles are to be able to be fitted for four radios, at least one of which shall be HF.

q. **Command Control and Communications.** The FOV shall incorporate a wireless connection for the crew and infantry commander to enable simultaneous communications using the vehicle communications system.

r. **Growth Potential.** The FOV shall be capable of future enhancement. Growth potential shall be anticipated and reflected in the FOV design. Such growth is unspecified, but is assumed to add at least 1,000 kg to the Army's existing payload requirements. As existing requirements are 4,000 kg, the FOV must be able to carry a total of 5,000 kg.

s. **Biological Chemical Defence (BCD) System.** The FOV shall be fitted with a BCD system.

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DESIRABLE CRITERIA

8. **Chemical Survivability.** The FOV should be resistant to the corrosive effects of NBC decontamination agents.

9. **Protection.** The FOV should have wheel skirts and the ability to be up-armoured to provide the following:

a. Frontal protection from cannon fire up to 30mm AP.

b. The ability to add-on protection against SRAAW (RPG-7 equivalent).

c. Improved armour to protect against 155mm HE artillery exploding 10 metres from the vehicle.

10. **Firepower.** The IMV should have a primary weapon station that allows the operator to fire the weapon from under armour. The Multi-Barreled Smoke Grenade Discharger should have the ability to fire an HE projectile.

11. **Towing.** Any vehicle in the FOV should be able to tow any other vehicle in the FOV.

12. **Dozer Blade.** The FOV should have a mounting for the fitting of a dozer blade if necessary.

13. **Seating.** The FOV should have seating suitable for rapid conversion into stretcher configuration.

14. **Access.** The FOV rear ramp should have a door within it with laser protected vision blocks.

15. **Stowage.** Secure (padlockable) stowage should exist on the outside of the vehicle for tools and other equipment.

16. **Vehicle Monitoring Systems.** The FOV should be fitted with a system which monitors the status of main automotive components, electrical power, fuel and ammunition.

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VARIANT MATRIX

17. Essential and Desirable criteria differences by variant are indicated in the following matrix.

Ser	Variant	Essential	Desirable
(a)	(b)	(c)	(d)
1	FSV	• Crew shall include a commander, gunner and driver • Shall include a turret mounted cannon of not less than 25mm calibre	• The turret should be of a type in service with an ABCA nation • The vehicle should have the capacity to seat at least four combat laden infantrymen on an occasional basis • The FSV cannon should be the 25mm M242 Bushmaster cannon widely used within ABCA countries.
2	IMV	• Shall move a nine man infantry section[5] about the battlefield. • Shall provide a buffered 50 calibre machine gun mount. • Shall provide a rear mount suitable for 7.62mm or 5.56mm section machine guns.	
3	IMV-C	• Seating shall exist for two crew, three command-post operators and three other passengers • The communications suite shall include an additional VHF radio and capacity for a spare HF radio	• The IMV-C should have external tentage for dismounted CP operations

[5] Nine men to comprise two crew and seven passengers.

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Ser	Variant	Essential	Desirable
(a)	(b)	(c)	(d)
4	IMV-E	• The IMV-E shall have a front mounted, hydraulically actuated dozer blade	
5	IMV-R	• The IMV-R shall have a capstan recovery winch with not less than 200kN line-pull and 200 m of rope/cable • The IMV-R shall have a hoist capable of lifting not less than 2,500 kg • The IMV-R shall accommodate a two man crew	• The IMV-R should have a front mounted, hydraulically actuated dozer blade • The IMV-R should have a remote control capability for winching operations • The IMV-R should have seating for the driver of any vehicle it recovers.

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VARIANT PRIORITIES

Ser (Pri)	Activity	FSV	IMV-C	IMV	IMV-R	IMV-E	IMV-A	Total Vehs
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)
1	2 x FSV Coys	24						24
2	1st Bn HQ and 3 x 1st Bn Coys		5	36				65
3	1st Bn Cbt Spt/CSS				3	3		71
4	2nd Bn 1st coy		1	12				84
5	1st Bn remaining HQ veh		2					86
6	1st Bn Spt Sects			6				92
7	2nd Bn Cbt Spt/CSS				3	3		98
8	2nd Bn HQ		4					102
9	2nd Bn 2nd coy		1	12				115
10	2nd Bn 3rd coy		1	12				128
11	2nd Bn Spt Sects			6				134
12	CSS and Ambulances				2	2	8	146
13	R & M (1)	2		4				152
14	Total	26	14	88	8	8	8	152

Notes: 1. R & M vehicles will be acquired with whatever funding remains after the last complete capability.

ANNEX C TO
ARMD VEH FDP
DATED26 MAY 99

ILS

Technical Risk

1. Technical risk is minimised if equipment is procured in a complete form 'off-the-shelf' from a large manufacturer. None of the NZ Army's armoured vehicle requirements are such that they are vastly dissimilar to those of most other Western nations seeking a 'general-purpose' FSV or IMV. Therefore, the NZ Army will minimise technical risk by acquiring an armoured family of vehicles, with full ILS incorporating codification and technical data packages, from a major manufacturer. The NZ Army will not develop a specific NZ armoured vehicle, nor any major items of equipment within it.

Through Life Support

2. A significant feature in recent armoured vehicle development has been improvements in maintainability. This has been aimed at improving Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR), and hence increased vehicle availability. As an example, earlier generations of armoured vehicles commonly have power packs that take approximately 8 hours to change. These have resulted in repair philosophies that mitigate against power pack changes by trying to conduct increasingly more intensive and technical jobs in forward areas. Such philosophies have resulted in decreased vehicle availability, higher technical levels of training for service personnel, more detailed test equipment and higher diversities of spares being required in-theatre. More recent generations of armoured vehicles have combined main supply items, such as power packs and cooling systems, and simplified their fitting so that power packs can be changed in as little as 1.5 hours. Maintenance philosophies for these types of vehicles are significantly streamlined and can translate to substantial savings over a vehicles life. The NZ Army will acquire an armoured vehicle that supports the later philosophies.

3. **Mid Life Overhauls.** Although there may be a mid-life enhancement to the capabilities of the armoured vehicles, there will not be a mid-life overhaul or scheduled chassis rebuild similar to that required for aluminium vehicles like the M113 APC. The NZ Army will follow an IRON (Inspection and Replacement Only if Needed) program similar to that initiated by the US Marine Corps.

Maintenance and Repair Philosophy

4. The Maintenance and Repair Philosophy will be based on the following:

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a. **Maintenance.** Defence will conduct light (unit) and medium (field) maintenance - although contractors may support Defence whilst in garrison situations. All heavy (Base) repairs will be carried out by a civilian contractor who will have access to all necessary technical data packages require to perform the job or backload it to the OEM (for example electronic LRU(line replacement unit) or sub assemblies).

b. **Fleet Management.** The manufacturer will provide a full fleet management regime, including Configuration Management System, RAM Data, technical support, and defect analysis.

c. **Supply Support.** The NZ Army will minimise Defence ownership of spares and consumables. It is intended that the field Army will hold 30 days supply of spares at unit and 90 days supply at field level. The manufacturer will be required to hold a contingency 90 day pack for deployment (at 30 days notice). All other inventory will be owned by the contractor. Defence will own all rotables (MSI).

d. **Configuration Management.** Vehicles are to be delivered with all configuration documentation. Defence will manage any changes to vehicle configuration.

e. **Technical Data.** The manufacturer will maintain all technical data.

f. **Support and Test Equipment (S&TE).** Defence will maintain ownership of all S&TE required to complete light and medium grade maintenance activities.

g. **Packaging, Handling, Storage and Transportation (PHS&T).** PHS&T will be fully contractorised.

h. **Repair Philosophy.** The NZ Army repair philosophy will be based on LRU and small MSI replacement at 1st line. At 2nd line, sub-assemblies and larger MSI will be replaced. The unserviceable sub-assemblies and MSI will then be backloaded for depot repair by the OEM.

i. **Cataloguing.** The vehicles are to be completely codified.

j. **Technical and User Documents.** Full technical documentation is to be provided electronically and on paper.

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CAPITAL PROJECT FINANCIAL SUMMARY

CAPITAL PROJECT FINANCIAL SUMMARY (COSTS FOR ARMD VEH(S))

ANNEX D TO ARMD VEH FOP DATED MAY 99

PROJECT : Armoured	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	TOTAL
OPTION	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
$000																														
Statement of Cash Flows																														
General Operating:																														
Total per Stand of Fin Performance	0.00	0.03	0.07	0.10	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	3.16
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]
Total	0.00	0.03	0.07	0.10	0.11	0.11	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	[illegible]
Financing:																														
Repayments	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	311.91
Capital Charge:		19.33	23.19	23.24	21.39	20.53	19.27	18.90	18.03	17.19	16.31	15.59	14.67	[illegible]	23.96	22.31	20.60	19.11	17.49	15.84	14.19	12.53	10.87	9.26	7.60	5.91	4.31	2.64	0.78	464.07
Operating Impact	0.00	19.36	23.17	23.33	21.50	20.64	19.44	19.02	18.15	[illegible]	[illegible]	15.70	[illegible]	23.72	[illegible]	22.43	20.81	19.24	17.61	15.96	14.30	12.72	11.08	9.49	7.71	6.03	4.43	2.85	0.90	378.73
Add/(less) Working Capital impact																														
Inventory Purchases	-3.85	-4.79	-1.97	-1.19	-1.55	-2.81	-1.56	-1.58	-1.90	[illegible]	[illegible]	-1.81	-1.61	[illegible]	[illegible]	-2.81	-1.79	-1.72	-1.73	-1.75	-2.86	-1.77	-1.79	-1.80	-1.81	-2.83	-1.81	-1.86	-1.93	-58.60
Other liabilities	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]
Add/(less) Investing impact																														
Fixed Asset acquisition/upgrade	-43.19	-3.63	-119.11	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-100.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-311.77
Fixed Asset disposal	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]
Term liability raised																														
CASH FLOW IMPACT	-47.24	-18.77	-143.34	-23.02	-23.06	-23.16	-21.46	-20.11	-19.76	-18.81	-18.27	-17.34	-16.45	-124.10	-23.73	-22.31	[illegible]	[illegible]	-19.34	-17.20	-17.26	-15.54	-12.07	-11.20	0.53	0.07	-0.27	-4.31	-2.01	-403.65
Statement of Discounted Cash Flows																														
Cash Flow impact	-47.24	-18.77	-143.34	-23.93	-23.96	-23.11	-21.46	-20.11	-19.76	-18.81	-18.27	-17.34	-16.45	[illegible]	[illegible]	-22.31	[illegible]	[illegible]	[illegible]	-17.70	-17.28	-15.34	-12.07	-11.20	0.53	0.07	-0.27	-4.31	-2.01	-403.65
Capital Charge is Added back	0.00	19.33	23.19	23.24	21.39	20.53	19.27	18.90	18.03	17.18	16.31	15.59	14.67	[illegible]	[illegible]	23.31	20.60	[illegible]	[illegible]	15.84	14.19	12.53	10.87	9.26	7.60	5.91	4.31	2.64	0.78	431.17
NET CASH FLOW	-47.24	0.44	-120.27	-0.70	-1.67	-2.63	-1.60	-1.20	-1.72	-1.73	-1.96	-1.75	-1.77	[illegible]	[illegible]	[illegible]	-1.62	[illegible]	[illegible]	-1.96	-3.03	-1.05	-1.90	-1.02	-1.01	-3.16	-1.96	-1.02	-1.25	-172.22
FINANCIAL SUMMARY																														
Operating Impact	-400.04																													
Cash Flow Impact	-403.65																													
@ Discount Rate	0.11																													
Net Present Value	-231.24																													

PROJECT : Armoured	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	TOTAL
OPTION	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M	$M
$000																														
Statement of Financial Performance																														
General Operating:																														
Spares/Other Non-cash		0.73	1.36	1.41	1.81	1.91	1.81	1.84	1.96	1.87	1.99	1.99	2.01	2.02	2.03	2.03	2.04	2.10	2.11	[illegible]	[illegible]	2.21	[illegible]	[illegible]	2.24	2.20	2.90	2.94	[illegible]	57.89
Maintenance, non inventoriable		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Personnel		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Not Other		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Financing:																														
Interest/Repayments		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Depreciation:																														
All Assets		3.86	3.97	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	7.81	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	16.73	319.89
Capital Charge:		19.33	22.19	23.21	21.39	20.53	19.27	18.90	18.03	17.18	16.31	15.59	14.67	23.81	23.96	22.31	20.60	19.11	17.49	15.84	14.19	12.53	10.87	[illegible]	[illegible]	[illegible]	4.31	[illegible]	0.78	431.17
Loss/(Gain) On Sale:	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]	[illegible]	[illegible]	0.00
OPERATING IMPACT	0.00	14.03	27.50	31.75	30.90	30.01	29.31	28.46	27.61	26.76	23.90	25.19	24.34	35.23	40.73	39.09	37.61	31.83	34.31	32.70	31.06	29.49	28.03	[illegible]	[illegible]	21.00	21.83	[illegible]	[illegible]	[illegible]
Statement of Financial Position																														
Current Assets																														
Cash	-47.24	-106.31	-247.65	-270.01	-292.09	-317.14	-339.60	-358.81	-378.57	-397.24	-418.91	-433.89	-450.41	-581.64	-610.31	-625.75	-658.21	-678.31	-688.63	-718.39	-733.87	-719.71	-751.88	-772.16	[illegible]	-790.69	-787.14	-801.64	[illegible]	
Inventory	3.85	4.91	3.60	3.64	3.44	4.17	3.87	3.59	3.45	3.21	4.19	3.81	3.11	3.37	3.23	4.20	3.94	3.61	3.40	3.11	4.09	3.61	3.21	2.87	[illegible]	2.72	[illegible]	[illegible]	4.00	
Non Current Assets																														
Fixed Assets	43.19	88.44	207.46	199.85	187.21	178.04	172.03	164.47	158.01	149.20	141.09	133.89	128.34	222.97	210.85	195.13	181.39	166.64	151.81	137.20	122.19	107.73	93.07	78.79	62.36	[illegible]	[illegible]	19.34	4.03	
Current Liabilities																														
Prov. for Operating (Surplus)/Deficit	0.00	14.03	41.87	73.64	103.78	133.83	163.14	191.60	219.21	245.96	271.87	297.93	321.39	356.61	397.35	436.41	471.61	510.03	544.31	577.93	608.11	637.60	665.01	692.11	710.03	730.91	[illegible]	[illegible]	[illegible]	
Other	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	[illegible]	[illegible]	
Sales of Old Vehicles			0.00	-0.50	-0.50	-0.50	-0.50	-1.00	-1.70	0.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	[illegible]	[illegible]	
Non Current Liabilities																														
Finance Source	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
NET ASSET IMPACT	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

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OFFICIAL INFORMATION RELEASED UNDER THE ACT

...ounted Vehicle

...ject Costs

NZD

...ial costs	QTY	NZD
...e assets per sheet 1		186,532,790
...astructure per sheet 1		10,000,000
Total Fixed Assets		206,532,790
...ers		85,000
...ers CRS		0
S Ammunition		2,507,840
...ning ammo		360,000
Total Inventory Costs		3,952,840
Total Capital Cash Outlay		212,485,630

...ual spares usage
...ual ammunition
...ual stock provision
...ual fuel consumption

...entory Cashflow Projection	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12
...Spares	85,000	175,000	175,000	298,000	300,975	303,980	307,015	310,080	313,175	316,302	319,460	322,650
...age	(340,000)	(710,000)	(710,000)	(1,190,000)	(1,201,900)	(1,213,919)	(1,226,058)	(1,238,319)	(1,250,702)	(1,263,209)	(1,275,841)	(1,288,599)
...creases	433,000	710,000	830,000	1,192,975	1,204,905	1,216,954	1,229,123	1,241,415	1,253,829	1,266,367	1,279,031	1,291,821
...s	175,000	175,000	298,000	300,975	303,980	307,015	310,080	313,175	316,302	319,460	322,650	325,871
...munition												
...s	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
...age	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)
...creases	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
...s	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
...CS												
...B	3,507,840	3,507,840	3,264,240	3,020,640	2,777,040	3,507,840	3,264,240	3,020,640	2,777,040	2,533,440	3,507,840	3,264,240
	0	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)
...ances	0	0	0	0	0	0	0	0	0	0	0	0
...creases	0	0	0	974,400	0	0	0	0	0	1,218,000	0	0
...B	3,507,840	3,264,240	3,020,640	2,777,040	3,507,840	3,264,240	3,020,640	2,777,040	2,533,440	3,507,840	3,264,240	3,020,640

...mmary	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12
...B	3,952,840	4,045,840	3,802,240	3,678,640	3,438,015	4,171,820	3,931,255	3,690,720	3,450,215	3,209,742	4,187,300	3,946,890
...age	(700,000)	(1,313,600)	(1,313,800)	(1,793,800)	(1,805,500)	(1,817,919)	(1,830,058)	(1,841,919)	(1,853,302)	(1,866,628)	(1,879,441)	(1,892,199)
...creases	793,000	1,070,000	1,190,000	1,552,975	2,539,305	1,576,954	1,589,123	1,601,415	1,613,829	2,844,367	1,639,031	1,651,821
...B	4,045,840	3,802,240	3,678,640	3,438,015	4,171,820	3,931,255	3,690,720	3,450,215	3,209,742	4,187,300	3,946,890	3,706,511

...reciation Calculation			Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12
...ssets cost		O/B	83,783,000	86,442,950	202,459,890	194,851,918	187,243,945	179,635,972	172,028,000	164,420,027	156,812,054	149,204,081	141,596,109	133,988,136
...ditions			5,617,000	119,132,790										
DT	Years	25 Depn	(2,957,050)	(2,115,850)	(7,607,973)	(7,607,973)	(7,607,973)	(7,607,973)	(7,607,973)	(7,607,973)	(7,607,973)	(7,607,973)	(7,607,973)	(7,607,973)
		0 NBV	86,442,950	202,459,890	194,851,918	187,243,945	179,635,972	172,028,000	164,420,027	156,812,054	149,204,081	141,596,109	133,988,136	126,380,163

...ashflow			Yr 0	Yr 1	Yr 2
...ancies		26/25	81,543,000	2,727,000	114,252,790
...structure		50	2,240,000	2,890,000	4,870,000
			83,783,000	5,617,000	119,132,790
...tock Obsolescences					
...RS Stock	3,507,840	28	3,507,840	3,507,840	3,507,840
			0	0	0
			3,507,840	3,507,840	3,507,840

...apital Charge Calculation		Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10	Yr 11	Yr 12
...ased on opening balance		86,442,950	202,459,890	194,851,918	187,243,945	179,635,972	172,028,000	164,420,027	156,812,054	149,204,081	141,596,109	133,988,136	126,380,163
...ventory		3,952,840	4,045,840	3,802,240	3,678,640	3,438,015	4,171,820	3,931,255	3,690,720	3,450,215	3,209,742	4,187,300	3,946,890
...tock Obsolescences		3,507,840	3,507,840	3,507,840	3,507,840	3,507,840	3,507,840	3,507,840	3,507,840	3,507,840	3,507,840	3,507,840	3,507,840
...otal		93,903,630	210,013,570	202,161,998	194,430,425	186,581,827	179,707,659	171,859,121	164,010,614	156,162,137	148,313,691	141,683,276	133,834,893
...apital Charge Rate	11%	10,329,399	23,101,493	22,237,820	21,387,347	20,524,001	19,767,843	18,904,503	18,041,168	17,177,835	16,314,506	15,585,160	14,721,838

Project: Armoured Vehicle
...tatement of Financial Performance(Operating Position)
...ersonnel:
...o change in manpower numbers

...ng	340,000	710,000	710,000	1,190,000	1,201,900	1,213,919	1,226,058	1,238,319	1,250,702	1,263,209	1,275,841	1,288,599
...ntenance	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
Fuel	18,000	37,000	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250
Stock Provision	0	0	0	0	0	0	0	0	0	0	0	0
RUC	15,120	34,020	34,020	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920
Total Operating Costs	733,120	1,141,020	1,166,270	1,665,170	1,677,070	1,689,089	1,701,228	1,713,489	1,725,872	1,738,379	1,751,011	1,763,769
Depreciation	2,957,050	2,115,850	7,607,973	7,607,973	7,607,973	7,607,973	7,607,973	7,607,973	7,607,973	7,607,973	7,607,973	7,607,973
Capital Charge	10,329,399	23,101,493	22,237,820	21,387,347	20,524,001	19,767,843	18,904,503	18,041,168	17,177,835	16,314,506	15,585,160	14,721,838
Operating Impact	14,019,569	27,358,363	31,012,062	30,660,489	29,809,044	29,064,904	28,213,704	27,362,629	26,511,680	25,660,858	24,944,144	24,093,580

Project: Armoured
Statement of Cashflows
Operating - NB Stock provision below

Capital Project Costs	(186,532,790)											
Infrastructure	(5,000,000)	(5,000,000)										
Inventory Purchases	(3,952,840)	(1,070,000)	(1,190,000)	(1,552,975)	(2,539,305)	(1,576,954)	(1,589,123)	(1,601,415)	(1,613,829)	(2,844,367)	(1,639,031)	(1,651,821)
Capital Charge	(10,329,399)	(22,101,493)	(22,237,820)	(21,387,347)	(20,524,001)	(19,767,843)	(18,904,503)	(18,041,168)	(17,177,835)	(16,314,506)	(15,585,160)	(14,721,838)
Cashflow Impact	(217,815,030)	(29,171,493)	(23,427,820)	(22,940,322)	(23,063,306)	(21,344,796)	(20,493,627)	(19,642,582)	(18,791,664)	(19,158,873)	(17,224,191)	(16,373,659)

Existing Operating Costs FY99/00	99/00	00/01	01/02	02/03	03/04	03/05						
Ammunition	571900											
Spares	777775											
Fuel	139774											
	Existing QAMR & School	1,489,449	1,489,449	1,489,449	1,489,449	1,489,449	1,489,449	1,489,449	1,489,449	1,489,449	1,489,449	1,489,449	1,489,449
	New Van Operating	733,120	1,354,520	1,409,870	1,908,770	1,920,670	1,932,689	1,944,828	1,957,089	1,969,472	1,981,979	1,994,611	2,007,369
	DA		(700,000)	(700,000)	(700,000)	(700,000)	(700,000)	(700,000)	(700,000)	(700,000)	(700,000)	(700,000)	(700,000)
	M113 Transitional Reduction	0	(744,725)	(744,725)	(744,725)	(744,725)	(1,489,449)	(1,489,449)	(1,489,449)	(1,489,449)	(1,489,449)	(1,489,449)	(1,489,449)
	Total	733,120	(60,105)	(34,655)	464,046	475,946	(256,760)	(244,621)	(232,360)	(219,977)	(207,470)	(194,838)	(182,080)

Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19	Yr 20	Yr 21	Yr 22	Yr 23	Yr 24	Yr 25	Yr 26	Yr 27	Yr 28
325,671	329,125	332,411	335,730	339,083	342,469	345,888	349,342	352,831	356,354	359,912	363,507	367,137	370,803	374,506	378,246
(1,301,485)	(1,314,500)	(1,327,645)	(1,340,922)	(1,354,331)	(1,367,874)	(1,381,553)	(1,395,369)	(1,409,322)	(1,423,415)	(1,437,650)	(1,452,026)	(1,466,546)	(1,481,212)	(1,496,024)	(1,510,984)
1,304,739	1,317,787	1,330,964	1,344,274	1,357,717	1,371,294	1,385,007	1,398,857	1,412,846	1,426,974	1,441,244	1,455,656	1,470,213	1,484,915	1,499,764	1,132,738
328,125	332,411	335,730	339,083	342,469	345,888	349,342	352,831	356,354	359,912	363,507	367,137	370,803	374,506	378,246	0
360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)	(360,000)
360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	0
360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	0
3,020,840	2,777,040	2,533,440	2,507,840	3,238,008	2,968,172	2,696,338	2,425,504	2,378,670	2,954,586	2,532,502	2,110,418	1,688,334	2,464,250	1,858,166	838,082
(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)	(243,600)
0	0	0	(28,234)	(28,234)	(28,234)	(28,234)	(28,234)	(178,484)	(178,484)	(178,484)	(178,484)	(178,484)	(584,484)	(584,484)	(584,484)
0	0	1,218,000	0	0	0	0	1,218,000	0	0	0	0	1,218,000	0	0	0
2,777,040	2,533,440	3,507,840	3,238,008	2,968,172	2,696,338	2,425,504	3,378,670	2,954,586	2,532,502	2,110,418	1,688,334	2,464,250	1,856,166	826,082	0

Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19	Yr 20	Yr 21	Yr 22	Yr 23	Yr 24	Yr 25	Yr 26	Yr 27	Yr 28
3,708,511	3,486,165	3,225,851	4,203,570	3,937,089	3,670,641	3,404,226	3,137,846	4,089,501	3,670,940	3,252,414	2,833,925	2,415,471	3,215,053	2,390,672	1,586,328
(1,905,085)	(1,918,100)	(1,931,245)	(1,970,756)	(1,984,165)	(1,997,708)	(2,011,387)	(2,025,203)	(2,191,405)	(2,205,499)	(2,219,734)	(2,234,110)	(2,248,630)	(2,669,328)	(2,684,108)	(2,699,068)
1,884,739	1,677,787	2,906,984	1,704,274	1,717,717	1,731,294	1,745,007	2,976,857	1,772,846	1,786,974	1,806,244	1,815,656	3,046,213	1,844,915	1,859,764	1,132,738
3,685	3,225,851	4,203,570	3,937,089	3,670,641	3,404,226	3,137,846	4,089,501	3,670,940	3,252,414	2,833,925	2,415,471	3,215,053	2,390,672	1,586,328	0

Yr 13	Yr 14	Yr 15	Yr 16	Yr 17	Yr 18	Yr 19	Yr 20	Yr 21	Yr 22	Yr 23	Yr 24	Yr 25	Yr 26	Yr 27	Yr 28
128,380,163	225,572,191	210,844,218	198,116,245	181,388,273	168,660,300	151,932,327	137,204,354	122,476,382	107,748,409	93,020,436	78,292,464	63,564,491	48,836,518	34,108,545	19,380,573
108,800,000															
(7,607,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)	(14,727,973)
225,572,191	210,844,218	196,116,245	181,388,273	166,660,300	151,932,327	137,204,354	122,476,382	107,748,409	93,020,436	78,292,464	63,564,491	48,836,518	34,108,545	19,380,573	4,652,600

108,800,000)

3,507,840	3,507,840	3,507,840	3,507,840	3,481,606	3,455,372	3,429,138	3,402,905	3,376,671	3,196,187	3,019,703	2,841,219	2,662,735	2,484,252	1,899,768	1,315,284
0	0	0	(28,234)	(28,234)	(28,234)	(28,234)	(28,234)	(178,484)	(178,484)	(178,484)	(178,484)	(178,484)	(584,484)	(584,484)	(584,484)
3,507,840	3,507,840	3,507,840	3,481,606	3,455,372	3,429,138	3,402,905	3,376,671	3,196,187	3,019,703	2,841,219	2,662,735	2,484,252	1,899,768	1,315,284	730,800

225,572,191	210,844,218	196,116,245	181,388,273	166,660,300	151,932,327	137,204,354	122,476,382	107,748,409	93,020,436	78,292,464	63,564,491	48,836,518	34,108,545	19,380,573	4,652,600
3,708,511	3,486,165	3,225,851	4,203,570	3,937,089	3,670,641	3,404,226	3,137,846	4,089,501	3,670,940	3,252,414	2,833,925	2,415,471	3,215,053	2,390,672	1,586,328
3,507,840	3,507,840	3,507,840	3,481,606	3,455,372	3,429,138	3,402,905	3,376,671	3,196,187	3,019,703	2,841,219	2,662,735	2,484,252	1,899,768	1,315,284	730,800
222,786,542	217,816,223	202,848,837	189,073,449	174,052,781	159,432,100	144,019,485	128,982,999	115,036,078	99,711,079	84,366,097	69,091,151	53,736,240	39,223,386	23,066,528	6,949,728
25,508,520	23,990,005	22,313,493	20,796,079	19,145,664	17,485,532	15,841,263	14,186,999	12,656,971	10,966,219	9,282,471	7,596,727	5,910,986	4,314,570	2,539,518	764,470

1,301,485	1,314,500	1,327,645	1,340,922	1,354,331	1,367,874	1,381,553	1,395,369	1,409,322	1,423,415	1,437,650	1,452,026	1,466,546	1,481,212	1,496,024	1,510,984
360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000	360,000
62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250	62,250
0	0	0	(28,234)	(28,234)	(28,234)	(28,234)	(28,234)	(178,484)	(178,484)	(178,484)	(178,484)	(178,484)	(584,484)	(584,484)	(584,484)
52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920	52,920
1,778,655	1,789,670	1,802,815	1,788,858	1,803,267	1,816,810	1,830,489	1,844,305	1,706,008	1,720,102	1,734,336	1,748,712	1,763,233	1,371,898	1,386,710	1,401,670
727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973	14,727,973
26,520	23,990,005	22,313,493	20,796,079	19,145,664	17,485,532	15,841,263	14,186,999	12,656,971	10,966,219	9,282,471	7,596,727	5,910,986	4,314,570	2,539,518	764,470
24,991,148	40,477,648	39,043,281	37,312,910	35,677,044	34,028,315	32,398,725	30,761,276	29,087,952	27,416,293	25,744,779	24,073,412	22,402,192	20,414,441	18,854,201	18,894,113

(1,864,729)	(1,877,767)	(1,890,904)
(25,508,520)	(23,990,005)	(22,313,493)
(27,271,259)	(25,637,591)	(24,222,457)

1,456,449	1,469,449	1,469,449
2,003,255	2,033,270	2,048,415
(700,000)	(700,000)	(700,000)
(1,469,449)	(1,469,449)	(1,469,449)
(169,194)	(156,179)	(143,034)

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APPENDIX 1 TO
ANNEX D TO
ARMD VEH FDP
DATED 26 MAY 99

EXPLANATORY NOTES

1. **Armour.** Add-on armour is required for the deployable battalion group. This will be fitted in NZ prior to deployment and provide the operational vehicles 14.5mm all round protection. 59 are sought to protect one company of FSVs (12), three companies of IMVs (39) and the eight command, engineer and recovery variants.

2. **Wheel-Skirts.** Armoured wheel skirts protect the tyres and improve the overall ballistic protection of the vehicle they are fitted to. 12 are sought to improve the FSVs armour and lessen their susceptibility to tyre damage. Whilst it would be desirable to have all the operational battalion's vehicles fitted with wheel skirts, only the FSVs are costed at present as it is essential that they are able to protect the IMVs and provide close fire support to the infantry when they dismount.

3. **NBC.** All the vehicles will have basic NBC equipment. That NBC equipment will provide every occupant with a filtered-air respirator and enable the vehicle to safely move away from a contaminated area. The NBC equipment sought does not allow the vehicle to 'fight' in an NBC environment, but does include a chemical agent detector.

4. **Situational Awareness.** The CSAM suite costed into all IMVs that have troops in the back provides the occupants with a view of what is happening outside the vehicle. A remote controlled, hardened TV camera provides images to a central TV inside the vehicle. That TV can also be used to display maps and other digital information as required.

5. **Laser Warning Receivers.** Every vehicle will be fitted with a Laser Warning Receiver to warn its occupants when they are likely to be engaged. Although the FSVs may be the vehicles best able to return fire, all vehicles fitted with such a warning system will be able to immediately undertake evasive manoeuvres to improve their chances of surviving the engagement.

6. **Vehicle Costs.** Although the ROM pricing indicates approximate prices NZ could expect to pay for its armoured vehicles and support equipment, it is known that these prices are substantially more than those that the Canadian Army paid only two years ago. Vehicles are consequently listed in order of priority at Annex B, and will be acquired down to whatever complete capability can be afforded. ROM pricing suggests a Phase 1 acquisition of at least 84 vehicles.

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7. **ILS.** ROM ILS pricing groups all ILS into a single block, and includes: training aids and simulation equipment; 3 years repair parts; specialist tools, test and diagnostic equipment; technical publications; overseas training courses; and two years in-country field service support for three manfacturing personnel. Some of that ILS is not required and all of it is for 128 rather than 84 vehicles. The ILS figures have therefore been modified to reflect the expected use by 84 vehicles undertaking NZ training profiles.

8. **Spares.** Spares are calculated on the basis of indicative Canadian Army operating costs (at NZ$2.98 a km including fuel[1]). Spares for 84 vehicles travelling 5,000 km annually are, with fuel of $62,250 deducted, $1.19 million. NZ supply requirements (30 days within the unit and 90 days at field level) are one third of that figure, ie $0.4 million. Annual spares consumption is inflated at 1%.

9. **Midlife Upgrade.** Although this vehicle does not require a mid-life upgrade by virtue of its on-going inspection and replacement programme, it is probable that there will be an evolution in armour, information and weapon systems that requires some sort of modification around the vehicles' half-life. Such an 'upgrade' has been budgeted for at half the original vehicles value.

10. **Infrastructure.** The following costs are anticipated to establish the armoured vehicles in Linton and Burnham. More accurate infrastructure requirements will be known after a consultant report is received in late July, and will be incorporated into the Cabinet Request to Commit which will tailor infrastructure to the acquisition plan, the vehicle numbers and types, and the transition plan. It is proposed that Army retain the allocated $10 million for infrastructure and staff separate Minor Force Development Proposals for each facility.

Seq	Facility	Remarks	Total	FY[2]
(a)	(b)	(c)	(d)	(e)
1	IMV Low-Cost Shelters	60 IMVs @ 2 IMVs per bay @ $20k per bay	$600k to $2.6 million[3]	01/02
2	FSV Enclosed Shelters	24 FSVs @ 30 m^2 @ $1k per m^2	$720k	99/00
3	Hard Standing	2 locations @ 10,000 m^2	$1.4 million	99/00

[1] This figure exceeds the manufacturer's figures by a factor of three, but is based on Canadian Army experience with a similar vehicle. It is the figure recommended to the team that visited Canada in Feb 99 and only marginally exceeds that expected by Logistic Executive staff familiar with armoured vehicle spare parts.

[2] FY in which expenditure begins.

[3] Consultants will begin a study into IMV shelters in Jun/Jul. The results of that study will be used to confirm shelter requirements. Costs could be as low as $600,000, but are more likely to be in the order of $2.6 million

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Ser	Facility	Remarks	Total	FY[4]
(a)	(b)	(c)	(d)	(e)
4	Stores/Offices	2 locations @ 500 m^2	$1.0 million	00/01
5	Battery Stores	2 locations @ 100 m^2	$200k	00/01
6	Wksp Extensions	Linton Burnham	$0.7 million $1.2 million	00/01
7	Roading	20 turning pads @ $10K	$200k	99/00
8	Access Gates	2 locations @ $50k	$100K	00/01
9	Fleet Management CIS	2 locations @ $40k	$80K	00/01
10	Simulator Room/Turret Procedural Trainer	2 locations @ 50 m^2	$100K	99/00
11	Second Linton POL point	Possibly colocated with new wash point.	$300K	00/01
12	New Linton Wash Point		$330K	00/01
13	Contingency		$1 million	99/00
14	Total		$10 million	

11. **Residual Values.** Detailed information about the residual values of the Scorpion and M113 is not known at present. It is hoped that the Scorpions might be sold to the Philippines for as much as $25,000 to $30,000 each. M113 residual value is not likely to be high considering the number of vehicles on the market at present and likely to remain so for some years, eg Canada has just announced of its fleet of 1,214 M113s, only 396 will be retained. It is probable that the M113s would sell for $8,000 to $10,000 each, however it may be several years before they are actually disposed of.[5] Potentially, disposal of old armoured vehicles could offset new armoured vehicle prices by approximately $1.2 million.[6]

12. **M113 Spares.** The current Obsolete Stock Provision calculation includes a 100% allowance for M113 spares. Therefore the financial impact is nil.

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[4] FY in which expenditure begins.
[5] Disposal of M113s will be in accordance with a a motorisation transition plan yet to be finalised.
[6] It is assumed $600,000 could be realised in FY 01/02 for the Scorpions, and another $600,000 in FY 05/06 for the M113s.

APPENDIX 2 TO
ANNEX D TO
ARMD VEH FDP
DATED 26 MAY 99

AMMUNITION NOTES

1. The following notes and tables explain the ammo calculations, all of which are based on the project initially acquiring two years training stocks and a full Contingent Reserve Stock (CRS).

Ser	Ammo Type	Nature	Cost NZ$
(a)	(b)	(c)	(d)
1	Training	M793 TP-T M910 TPDS-T	$33 $45
2	Operational	M791 APDS-T M792 HEI-T	$130 $73

Operational Ammo

2. **CRS.** The CRS to be between 3 and 4 first lines for 12 vehicles. 4 first lines will reduce to 3 as operational ammo is expended annually at a rate of 1/15 of the total stock. This will ensure that periodic replacements of operational ammo every four to five years are able to include new ammo types not yet manufactured. 3 first lines will allow a minimum of one in the vehicle, another in the unit and a third in the echelon.

Training Ammo

3. **Individual Training.** Each gunner will require four shoots to complete individual training, after simulation and sub-calibre firing has been completed. Each shoot will be 50 rnds. Two shoots will each use 50 rnds of one training ammo type, the other two will use 25 rnds of each training ammo type.

4. **Company Training.** Each FSV company will conduct four activities with live shoots annually. One of these shoots (probably the FSV Company Commander's annual exercise) will utilise operational ammo, the other three (each in support of one the other three manoeuvre companies in the battalion) will use training ammo. All shoots will be 50 rnds, half of which will be each of the two ammo types.

5. **Battalion Training.** The battalion commander will have two exercises that will involve live firing with the FSV. One will be a training exercise and will use training ammo. The other will be the annual evaluation exercise and will use operational ammo. Both shoots will be 50 rnds, half of which will be each of the two ammo types.

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Total

6. Two years training ammo and a CRS will cost $3.507 million. The annual ammunition costs are tabled below.

Ser	Activity	Training Ammo	Operational Ammo
(a)	(b)	(c)	(d)
1	Individual training	$172,800	nil
2	Company training	$140,400	$121,800
3	Battalion training	$46,800	$121,800
4	Subtotal	$360,000	$243,600
5	CRS	nil	$3,507,840

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