

1.INTRODUCTION

- This document details the requirements for the vehicle and additional services.
- Capitalized terms used within this document are defined in Section 2 Definitions.

2.DEFINITIONS

| Term | Definition |
|--------------------------------------|---|
| Cabin | The part of the vehicle where the driver sits. |
| C&U | Road Vehicles (Construction and Use) Regulations 1986 (As amended) |
| Driver | The qualified person operating the vehicle. |
| EC Type Approval | The procedure whereby an authority of an EU member state certifies that a type of vehicle, system, component, or separate technical unit satisfies relevant technical requirements and administrative provisions listed in the Directive. |
| Gross Vehicle Weight (GVW) | Also known as the Maximum Authorised Mass (MAM) meaning the weight of a vehicle including the maximum load that can be carried safely when it is being used on a public road. |
| Operate/ Operation / Operating | The operational use of the vehicle whilst being prepared, performing winter service duties, stored, or being maintained which includes the repair of any faults. |
| Pre-Delivery Inspection | Often referred to as PDI - Procedure carried out by the supplier to verify that the vehicle is built to the agreed functional and quality standard, meets the technical requirements and is ready for delivery. |
| Service Provider | Organisations, appointed by the purchaser, who have a responsibility to operate and maintain the vehicle. |
| Severe Weather | Severe weather refers to any meteorological phenomena with the potential to endanger safe passage or cause disruption on the Strategic Road Network (SRN) and includes snow, ice, heavy rain, high winds, fog, and high temperatures. |
| Snow Blower | Equipment to expel snow from the carriage way' |
| SRN | Strategic Road Network – Road network for which National Highways is responsible for |
| Traffic Areas | Paved areas on which there is vehicular and/or pedestrian traffic. |
| USB | Universal Serial Bus |
| Vehicle | Refers to the completed vehicle as supplied by the supplier |

3.VEHICLE

Specification.

Listed below is the minimum requirement for a MPV for National Highways.

- Clearing capacity as a minimum 1000 tonnes per hour.
- Cutting width minimum 2000mm.
- Cutting height minimum – 1250mm / 1550mm lifted.
- Road legal capable of traveling on any part of the road network including motorway, all-purpose trunk road and rough terrain.
- Meet or exceed current Euro 6 emissions standards.
- Declare any alternative fuel sources.
- A PTO system to operate a snowblower and any other compatible equipment.
- The ability to attach additional equipment at either the front, rear, or body to allow for additional road maintenance or winter operations.
- 360 degrees integrated camera system.
- Hydraulic couplings (stainless steel).
- The proposed vehicle shall meet all the relevant BS and EU standards and regulations for manufacture, operation and health and safety for a road going vehicle.

Chassis Derivatives

- All chassis' will be based on 'Road Friendly' suspension as defined under Road Vehicles (Construction and Use) Regulations 1986 (As amended). Air suspension may be supplied if it forms part of the vehicle specification.

Operation

- The vehicle is required for winter service duties primarily on Motorways and All-Purpose Trunk Roads in England.
- Each vehicle shall be capable of starting unassisted and operating at ambient air temperatures down to -15° Celsius in the winter service environment.
- The multi-purpose vehicle will be capable of mounting a snow plough onto a standard "DIN" plate on the front of the vehicle, operating its lift, lower and angling hydraulics.
- All preparation and driving operations including snowblower, snow cutter mounting, and cutter operation will be a single crew operation.
- The vehicle design shall ensure all operations can be undertaken safely by the employees of the purchaser's service providers whose stature may vary from a fifth percentile female to a 95th percentile male (as defined in the Society of Automotive Engineers (SAE) Anthropometric Reference Data 2015).
- Ensuring the Operation complies with "The Work at Height Regulations 2005 (as amended)".
- Assessing each operation using the "HSE INDG478 - Risk Assessment of Pushing and Pulling (RAPP) tool (2016)" or equivalent method to ensure that the key risks have been identified and mitigated within the design and that the "Manual Handling Operations Regulations 1992 (as amended)" are complied with.

- How is the suggested equipment mounted i.e., can it be mounted by a single driver, or does it require a specialist operative?
- Is the purchasers snow plough be able to be mounted and operated.

Driver vision

- Each vehicle shall be supplied with additional high performance and energy efficient lights to provide dipped and main beam operation in accordance with functional requirements of the Road Vehicles (Construction and Use) Regulations 1986 (as amended), when any equipment is mounted and obscures the standard vehicle lighting.
- The lights shall be directly and permanently mounted to the chassis cabin structure (not body panels) with any auxiliary driving lamps located on the roof and contained within a lightbar.
- The lights shall be mounted in such a way that they will not vibrate or easily be knocked or move out of alignment and shall be protected from stone damage.
- Each vehicle shall be equipped with systems to ensure the driver has clear visibility under all weather and operating conditions including the formation of ice and mist. These systems will include.
 - Windscreen wipers.
 - Cabin heating and dehumidification.
 - Heated mirrors.
 - Cameras to provide cover of the rear and all other vehicle blind spot areas.
- The heating and de-humidification systems shall rapidly clear ice and mist, independently of the temperature of the vehicle engine.
- The windscreen wipers including motors, linkages and blades shall be suitably sized so that they can achieve efficient clearance of the windscreen to ensure the driver has an adequate view to the front of the vehicle. This shall include clearance during severe weather conditions including the prevention of build-up of heavy snow on the windscreen or bonnet area in proximity to the wiper arms.

Driver Communication

- The vehicle shall be fitted with an integrated Bluetooth interface connection fitted by the chassis manufacturer as part of the chassis and cab that will allow the connection of a Bluetooth mobile phone to make and receive telephone calls.

Ergonomics

- All vehicle controls shall be ergonomically designed and located for ease of driver only operation.
- The supplier shall design the vehicle to minimise driver distraction and manual intervention whilst driving.
- The design of the vehicle cabin and its contents shall ensure that driver access and egress through both nearside and offside doors is not hindered.
- The supplier shall provide the outputs of the ergonomic requirements for approval by the purchaser. This shall include photographs, drawings, and any test results to support the proposed vehicle design.
- The use of visual icons shall be utilised throughout the supplier solution to minimise text warnings/messages to the driver and shall be in line with the requirements of ISO 2575:2010 +A7:2017.

Manoeuvring and Reversing

- Each vehicle shall be fitted with an audible white noise reversing warning.
- Each vehicle shall be fitted with forward facing and rearview cameras (minimum of 140° viewing angle), the reverse camera shall go live automatically when reverse selected and capable of operating during both daytime and night-time lighting conditions.
- The cameras shall be positioned to prevent the build-up of debris during operation.
- The supplier provides additional cameras to cover any vehicle blind spots.
- The camera system will have the ability to record all camera inputs on removable media.
- The camera monitor shall be capable of displaying individual camera displays as well showing all cameras at the same time.
- If a standalone camera monitor is supplied, it shall be ergonomically mounted in the fascia area and shall comply with the ergonomic requirements stated in the ergonomics section.
- The camera shall be capable of being displayed and controlled by the main controller and displayed on any system screen(s) provided by the supplier (selectable by the driver).

Safety equipment and signs

- The vehicle shall be equipped with a 2kg dry powder fire extinguisher suitable for vehicle carriage for use on Class A, B, C fires, respectively.
- Extinguishers shall be kite marked and Fire Equipment (BAFE) approved to BS EN3 or equivalent standard. The location of the fire extinguisher shall be considered in the ergonomic design of the cabin and mounted such that it can be accessed easily but does not interfere with any driver operations.
- "No Smoking" signs shall be fitted in each compartment of the vehicle in which people can be carried. This shall indicate the international no-smoking symbol no smaller than 70mm in diameter.
- The vehicle shall be fitted with CCTV signs front and rear of the vehicle. The supplier shall agree details with the purchaser for the text and graphics as well as placement on the Vehicle.

Cabin

- The cabin shall be ergonomically designed for ease of operation with adequate storage space provision and shall include:
 - Cushioned, adjustable high-backed seating with head restraint and three-point seat belt.
 - A4 document holder.
 - A '1 to 10' employee CE approved First Aid Kit.
 - Provision for accommodating a medium sized holdall bag approximately 31H x 64W and 30D (dimensions in cm)
 - Interior working light.
 - Storage hooks placed behind the driver, for a minimum of two high visibility coats so that they do not make contact with the driver whilst driving and.
 - Any additional Personal Protective Equipment (PPE) such as safety helmet and over-trousers.

- The interior of the cabin shall be made from robust materials that are suitable for the vehicle's operation and environment.
- Anti-slip, mesh access steps to the cabin shall be provided. The steps and the area at ground level below the steps shall be lit. whilst stationary and during pre-shift vehicle checks.
- The front of the cabin below the windscreen should be continuous to minimise the potential for snow accumulations to build up.
- The cabin shall include an auxiliary power socket The socket should be a 12V power feed rated at max 20A The cabin shall include a standalone USB charging socket.
- The cabin shall have a dedicated/standalone 24v power feed for the installation of an ESN cradle.
- Cabin heating shall be provided that can maintain a minimum temperature of +16°C inside the cabin whilst the ambient temperatures outside the vehicle are as low as -15°C both when the vehicle is in operation and when the main engine is turned off.
- The cabin shall be capable of earthing a roof mounted communications aerial and shall be designed to allow easy access for the wiring of a roof mounted communications aerial.
- The operator will be able to operate any attachment from inside the cabin with control panels easily accessible. An appropriate combination of mechanical, audible, and visual means of interaction that will enable the driver to always maintain safe control of the vehicle and full visual surveillance of the road environment around it whilst it is in motion.

Weight and Stability

- The supplier shall design the vehicle so that it is stable. This shall include conducting a review of the weight distribution and center of gravity of the vehicle in all modes of operation and with all options of ancillary equipment fitted. Any equipment shall not overload the vehicle or individual axle.

Transmission

- The vehicle transmission must support the various traction functions, including various speeds and weather conditions including snow blowing operation of the proposed vehicle.

Wheels, tyres, traction, and braking

- Each vehicle shall be capable of maintaining positive traction to all driven wheels, for all road surface conditions whilst in travel and operating in a winter service environment.
- All axle wheels on each vehicle shall be fitted with designated standard tyres suitable for the winter service environment. The supplier shall provide additional equipment to aid traction in adverse conditions such as compact snow or ice and provide storage for it.
- Each vehicle will be fitted with wheel nut movement indicators.
- The braking system on each vehicle shall be capable of operating efficiently within the winter service environment.
- This shall include the mitigation of any impact the following could have on the system:
- The vehicle can stand unused for operational use for prolonged periods of time.

- The vehicle is washed down after each operation and as such brakes can be cooled rapidly.
- Operate in an environment where it will come in contact with salt/brine.

Fuel and Emissions

- Each vehicle shall be capable of operating on diesel fuel to BS EN 590 or HVO fuel to EN 15940.
- Each vehicle shall meet Euro 6 emission standards (as a minimum) at point of delivery.

Design Life

- Each vehicle shall be designed to operate reliably within the winter service environment for a minimum of 10 years.
- Internal and external vehicle components shall be made of materials that do not suffer accelerated corrosion.
- Where the use of these materials cannot be avoided, they shall:
- Have protection systems which are suitable in performance to meet the intended service schedules.
- Be listed and clearly identified in the maintenance schedule.
- Engine exhaust systems shall be manufactured from materials suitable for the winter environment, suitably shielded, and located away from corrosive elements where possible.

Ease of Maintenance

- The design of each vehicle shall ensure that maintenance regimes are minimized.
- All fixings shall use metric fixing standards and avoid the need for special tools wherever possible.
- Nonstandard tools which have been identified for maintenance and / or operation of the vehicle shall be provided by the supplier. This will be one tool per vehicle.
- Any interim maintenance activities (inspection, fluid top up or greasing) other than the designated full summer maintenance activities, will have service points within easy reach of the technician without the need for dismantling of any sub-systems.

Minimising parts and common components

- Parts count and complexity across the vehicle types and derivatives shall be kept to a minimum.
- A bill of materials shall be produced and issued to the purchaser for each vehicle.
- All vehicle builds shall have parts supplied to the same level build levels unless agreed with the purchaser beforehand. Where this cannot be achieved the supplier shall use components that are fully interchangeable with the original OEM part.

Recovery

- An easily identifiable system for the recovery of the vehicle shall be provided at the front and rear of the chassis.
- A laminated recovery card shall be provided in each vehicle outlining the recovery process. Ten spare cards will be provided to the project team for added distribution, as necessary.

Electrical installation

- Each vehicle chassis or body must not be used for earthing purposes and a separate insulated earth return wiring system must be provided with appropriate separation for power and signal grounds.
- An external battery isolator switch shall be fitted. With an isolator button fitted inside the vehicle cab for emergency use by the driver.
- Electrical components fitted shall be protected from damage and able to cope with any electrical load dump characteristics, such as jump starting the vehicle.
- The vehicle electrical system must be capable of load balancing with the vehicle alternator for all the intended operations.
- Electrical connections shall be fitted with terminals and connectors suitable for the environment they will be exposed to. (Protection with the use of synthetic resins such as silicon shall not be acceptable as these will require regular maintenance).
- All harnessing runs shall be mounted with suitable cable tie clips edge, hole mount or 'p' clips. No adhesive clips or mounts shall be used.

Hydraulics

- The hydraulics must be able to support the minimum snow blowing capacity specified if the hydraulic solution is proposed. It shall be capable of operating any additional equipment which may be used in conjunction with the snowblower.
- The hydraulic fluid reservoir shall be fitted with a corrosion resistant manual shut off valve.

4. VISIBILITY

- The supplier shall obtain purchaser approval for the vehicle's conspicuity markings and equipment design. This includes:
 - The placement of beacons and additional lighting
 - The proposed colours for the chassis, cabin, and attachments.
 - The National Highways company branding on the vehicle.
- The required beacons shall be protected to prevent damage from any operations undertaken and positioned not to affect the driver's vision.
- Lighting beacons will be in operation at all times but will also be fitted with manual override option available for when beacons are required to be switched off whilst vehicles are static in depot.
- The colour for the cabin, vehicle body, side protection panels and attachment should be orange or supplied with the vehicle wrapped orange (RAL 2011).
- Vehicle livery and reflective marking shall meet current regulations, utilising Avery V8000 materials.

Markings shall either:

- Be applied directly to the vehicle bodywork that is clean and free from detritus; or
- Be mounted on boards fixed to the bodywork using tamper-proof fixings.
- Rear markings shall comply to Chapter 8 (Ch8) traffic management

requirements.

National Highways livery and fleet referencing

- All vehicles shall be marked as detailed by the purchaser. The electronic versions of the images to be used shall be provided by the purchaser.
- All letters and numerals used in the livery shall be transport heavy font as specified by the Traffic Signs Regulations and General Directions, 2002, Schedule 13, Part II.
- Fleet numbers will be allocated to the supplier to be used on any equipment supplied under the contract.

5.DOCUMENTATION

- The supplier shall provide documentation to the purchaser the following documentation in both a hardcopy and digital version and include the following:
 - Operational handbook.
 - Workshop repair manual.
 - Vehicle management plan.
 - Parts catalogue.
 - Build card.
 - Vehicle maintenance history book.
 - Vehicle certificates will be provided for all test conducted to ensure build quality and the relevant legal standard is complied with.
 - Manufacturers maintenance and service schedule.
- A build card shall be completed by the supplier for each vehicle. The build card shall record all the relevant build information including any rework prior to delivery to the purchaser. A copy of the build card shall be retained by the supplier for the life of the vehicle and may be accessed by the purchaser upon request free of charge.
- The supplier shall prepare and deliver a vehicle management plan. This shall cover the maintenance and service requirements for the whole life of the vehicle.

6.SERVICES

- The Supplier shall provide the following services:
 - Supply vehicles capable of snow blowing to the minimum requirement or better.
 - Provide technical and operator training at the purchasers premisses.
 - Maintain records and provide reports.
 - Provide after sales support as specified in manufacturer warranty.

7.VERIFICATION AND ACCEPTANCE

- The verification plan shall confirm any requirements on the purchaser for the purchaser approval process to ensure the program is maintained.
- Where the chassis or the cab requires modification, the supplier shall demonstrate compliance with the manufacturers coach and bodybuilding requirements as part of the verification to ensure that the vehicle warranty is not compromised through the suppliers' design and must be agreed and signed off by NH.
- The verification plan shall detail the procedures that will be used to provide the purchaser the necessary confidence that each vehicle will meet the technical requirements and is acceptable at the following stages of delivery:
 - Initial design before any vehicles is built or provided and is signed off and agreed by NH.
 - Completion of the first vehicle of each type built at the factory.
 - Subsequent vehicle builds at the factory.
 - Vehicle delivery and hand over at the purchaser's premises.
 - Familiarisation training and train the trainer training at each of the depots where the vehicle will be based.

8.INFORMATION SECURITY

- The supplier shall ensure that all purchaser data is managed in accordance with His Majesty's Government Security Policy Framework requirements for information with an OFFICIAL classification.

9.WARRANTY

- For the purposes of this specification the warranty period covers any chassis and vehicle conversion aspects. The minimum period for each aspect will be 24 months.
- The warranty period for the completed vehicle shall commence for each vehicle at the point of delivery and acceptance by the purchaser.
- Any specific exemptions to the warranty shall be clearly identified and agreed with National Highways prior to order.
- The supplier shall accept all responsibility for quality, design, and workmanship of all such materials and components, whether manufactured by them or supplied to them by others.
- Where the chassis or the cab requires modification, the supplier shall demonstrate compliance with the manufacturers coach and bodybuilding requirements as part of the verification and acceptance, as detailed in Annex A, to ensure that the vehicle warranty is not compromised through the suppliers' design.

Annex A: Example of Vehicle Acceptance

| Vehicle Registration Number: | | | |
|--------------------------------------|------------------------------|----------------------------|----------------------------|
| HE Number: | | | |
| Chassis no: | | | |
| Depot: | | Date of delivery: | |
| Area: | Inspected by: | | Date of inspection: |
| Inspection Area | Undamaged Please tick box | Damaged Please tick box | Comments |
| Cab Exterior and Interior | ✓ | | |
| Cab, Controls, door etc. | ✓ | | |
| All Lights Indicators, and Beacons | ✓ | | |
| Tyres and Wheels | ✓ | | |
| Fuel Tank & Exhaust System | ✓ | | |
| Spreader Body and Reject Screens | ✓ | | |
| Liquid Tanks (pre-wet & Acetate) | ✓ | | |
| Spreader Hydraulic Hoses and Spinner | ✓ | | |
| Rear Chevron Board | ✓ | | |
| First Aid and Tools | ✓ | | |
| Vehicle Spare Keys | ✓ | | |
| Manual & Vehicle Build Card. | ✓ | | |