

SCHEDULE 22

FINAL VEHICLE DESIGNS

NBfL -Build Specification



Document Introduction

- The purpose of this document is to define the build specification of the Vehicle.
- The document is split into 13 separate sections which outline the key build areas of the vehicle.
- Available options for Operator configuration are highlighted in yellow boxes.
- Nothing contained within this document precludes the requirements of the specification and the contractual performance obligations as set out in the NBfL Contract between TfL and Wrightbus..
- This document may be subject to ongoing development and that the information contain within this document may be altered, or added to during the project.

Revision History

Revision	Date	By	Comments
A	1/12/10	REDACTED	
B	16/12/10	REDACTED	Updated to reflect MCR Response dated 14/12/10
C	21/1/13	REDACTED	Updated for Production Vehicles
D	15/3/13	REDACTED	Updated Fire Retardancy and CCTV details

Section 1 Vehicle Information

Body Type:	NBFL Double Deck to CUS-02351
Seating Capacity	40 seats, Upper deck 22 seats, Lower deck (includes 4 priority and 6 preferential seat places) 1 Wheelchair passenger
Standees	25
Maximum Capacity	87 passengers
Compliance	Compliant to National Small Series Type Approval

1.1 Vehicle Dimensions

Overall length:	11,232 mm
Overall Height:	4,420 mm
Maximum Overall Width:	2,520 mm
Front Overhang:	2,611 mm
Rear Overhang:	2,621 mm
Wheelbase:	6,000 mm
Step Height (at Ride Height):	315 mm (Doors 1 & 2) 335 mm (Door 3 / Rear Platform)
Step Height (at Kneel)	270 mm (Doors 1 & 2) 335 mm (Door 3 / Rear Platform)
Approach angle	7°
Departure angle	7°
Interior Headroom	1,810 mm (Upper) 2,070 mm (Lower)
Unladen weight	12,000kg

Section 2 Chassis Information

2.1 Chassis Details

Chassis type:	Low floor, Hybrid, double deck
Chassis Model:	WB-NBFL-01
Chassis Frame:	RHS steel tube and channel sections
Corrosion protection:	Anti-corrosion paint system on main chassis frame Removable components, hot dip galvanised
	All closed tubes wax injected Underbody wax applied to all exposed steel work on finished vehicle.
Front Axle:	REDACTED
Rear Axle:	REDACTED
Tyres:	Front, 315/60/R22.5 Rear, 275/70/R22.5
Suspension:	Pneumatic suspension with rolling type bellows
Kneeling Facility:	Complete N/S kneel
Service Brake:	Disc brakes fitted to all axles WABCO EBS control system with pneumatic back-up
Parking Brake:	Spring loaded brake cylinders on rear axle
Brake Control System:	ABS
Fuel tank:	200 litre aluminium tank with usable capacity of 150 litres.

Fuel fill: Fuel fill located on the offside of the vehicle behind the drivers signal window. The fuel fill is concealed behind a hinged aluminium panel.

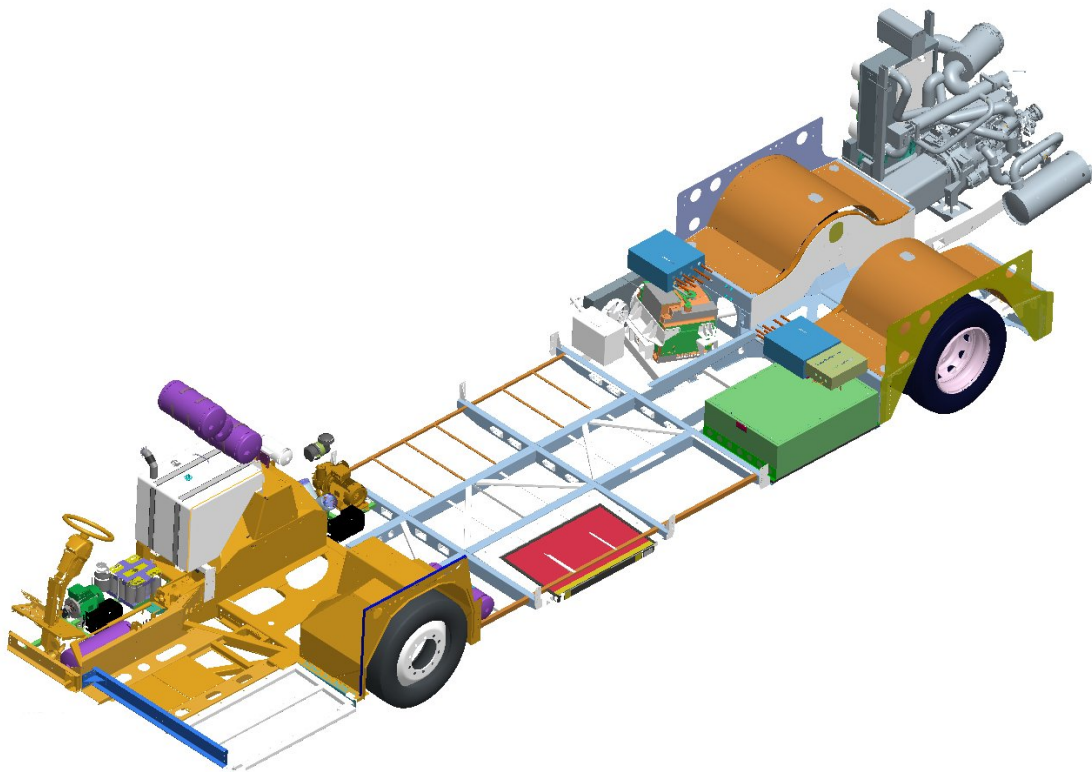
Standard Configuration :	Over-centre locking lid covering a standard fill neck.
Option:	Posiloc Identic

Urea Tank: 40 litre plastic tank with approx. usable capacity of 37 litres.

Urea Fill: Standard fill neck secured by a screw cap. The fill point is located on the offside of the vehicle immediately forward of the rear axle. The fill point is concealed behind a hinged access door.

Section 3 Hybrid Driveline

3.1 Hybrid Driveline



Generator:	REDACTED
Drive Coupling:	REDACTED SAE 2 compatible
Drive motor:	Siemens Permanent Magnet Motor REDACTED
Battery:	Valence REDACTED liquid cooled
Power Inverters:	Siemens ELFA 2, 4-phase mono inverters, liquid cooled
DC-DC Converter:	REDACTED water-cooled unit
Air compressor:	Independent liquid cooled, with integrated motor/inverter drive unit
Power steering:	Independent, liquid cooled, with integrated motor/inverter drive
Air-con Compressor:	Denso unit, belt driven off the engine
Diagnostics:	Standard via dashboard and laptop Option for real time and data-logging, Internet based diagnostics .

The body structure will be designed to provide direct connection with chassis main frame outriggers.

4.1 Main Body Structure

The main body framework is constructed from "Aluminique" extrusions and is assembled using aluminium castings and forgings. The main body structure extends from the front pillar to the vertical pillar directly behind the rear axle.

Chromate jointing compound will be used when assembling dissimilar metals to prevent electrolytic corrosion.

4.2 Front Framework

The front framework is a combination of bolted and welded steel and aluminique sections making up a safety barrier to give protection to the driver.

The front frame houses the support brackets for the high level wiper rail.

4.3 Rear Module

The rear module is a self-supporting composite structure bolted directly to the main body structure and chassis.

4.4 Roof

The "Aluminique" framework comprises of two full-length cantrails with intermediate framework. A one-piece 19G aluminium roof panel is bonded to the framework to ensure no ingress of water and maximum structural strength.

The roof includes a fibreglass roof pod which covers the roof mounted evaporators and provides an emergency escape route via a break glass panel.

4.5 Interfloor

The interfloor framework is constructed from "Aluminique" extrusions and is assembled using aluminium castings and forgings. It is connected to the sidewall with structural interfloor brackets.

Section 5 Floor Structure

The floor of the vehicle has been designed to provide one step entry on to stepless floor which extends from the front of the passenger saloon to the rear. The aisle shall be ramped slightly over rear axle.

5.1 Lower Deck Floor

The lower saloon floor shall be constructed from three composite materials:

1. Flooring at doors 1 and 2 – 12mm & 15mm polyurethane based Composite board. The composite floor board has a fire Retardancy rating of EC95/28 Annex 4.
2. Main saloon – 12mm high durability plywood with phenolic face manufactured to class 3 fire Retardancy top side and class 2 underside.
3. Rear Gangway – 12mm high durability plywood with phenolic face manufactured to class 3 fire Retardancy top side and class 2 underside.
4. Rear Platform – 40 mm Composite Board, with two skins of epoxy FRP covering foam core manufactured to class 1 fire Retardancy.

5.2 Wheelarches

Manufactured from GRP with reinforcing at all stress points and attachment areas. The wheelarches shall meet class 2 fire Retardancy. The underside of each box shall be protected against tyre burst by a steel inner guard.

5.3 Upper Deck Floor

The upper saloon floor shall be constructed from 12mm plywood manufactured to class 3 fire Retardancy top and bottom.

6.1 Exterior Front End

The front panelling of the vehicle is a five piece sectionalised fibreglass moulding with the lower centre section acting as a hinged door to give access to the demister unit for general maintenance.

The upper windscreen, lower windscreen and destination glass are all bonded in place (see section 7.00 for details of glass).

The exterior fibreglass shall meet class 3 fire Retardancy on the front surface.

6.2 Exterior Rear End

The exterior rear end is formed as a complete rear module. The Module is manufactured from Fibre Reinforced Plastic and incorporates the rear dome and rear gangway floor area. Due to its nature this module, attached to the main body structure, is self supporting and takes away the need for a main substructure. The module is manufactured in five separate pieces to facilitate repair in the event of damage.

The engine access door is a moulded GRP piece. It incorporates an access flap to facilitate oil fill.

6.3 Main Side Panelling

The main side plank fitted below the lower deck windows is a one- piece 2.5mm Aluminique extrusion mechanically fixed to the side framework. The top fixings on these panels are hidden behind a removable rubber infill.

The panelling above the lower deck windows is a sectional, 2mm aluminium panel mechanically fixed to the main framework.

6.4 Side Skirt Panels

The skirt panels are manufactured from 2mm aluminium. All panels are produced in bay lengths. To enable quick turn around time in the event of a side accident the panels are attached using the Quick Lock clamp system at the top and a torx headed bolt at the bottom,.

Access to the 24v batteries, washer bottle and the power steering assembly is facilitated through a hinged panel at the front offside. The panel is top hinged, and secured in the closed position by two locking Southco type latches. When required the panel is held open by a telescopic stay.

The skirt panels also include radiator grills where necessary. The grill is manufactured as a twisted louvre.

Fibreglass finisher shall be applied on the edge of the skirt panel around each wheel.

6.5 Headlamps and Daytime Running Lights

Circular halogen headlamps incorporating side light, dipped and main beam are supplied mounted inside a ring containing 8 LED Daytime running lamps. Sidelights can be powered with the headlight switch on along with the battery master switch. Main and dipped beam can only be achieved with the ignition switch in the on position.

6.6 Front Indicators

A low level circular indicator unit shall be supplied adjacent to the headlight units.

6.7 Front Marker Lights

Two LED outline marker lights shall be fitted at the top outside edges of the front lower screen. Colour – White

6.8 Side Indicators

N/S and O/S LED indicator units shall be fitted in the main side plank adjacent to the front of the vehicle.

6.9 Taillights

Three LED light units shall be fitted vertically in the lower corner section on both the N/S and the O/S of the vehicle. The top light on each side shall act as a rear indicator, the middle light as both taillight and brake light. The bottom light of the cluster shall act as reversing lights.

6.10 Rear fog light

A fog light shall be mounted on the O/S of the rear number plate.

6.11 High Level Rear Light

A high level rear brake light shall be mounted on the upper rear dome above the window. The LED light shall be located on the centreline of the vehicle.

6.12 Rear Marker Lights

Two LED outline marker lights shall be fitted at the top outside edges of the rear dome. Colour – Red.

6.13 Reflectors

14 reflector plates shall be fitted at various low level locations around the vehicle to meet legal requirements.

6.14 Number Plate Lights

The rear number plate, fitted at the rear bumper, shall be illuminated by two LED light units.

6.15 Number Plates

Number plates shall be supplied and fitted at the front and rear bumpers. (NB customer to notify registration details)

6.16 Driving Mirrors and Arms

The N/S mirror shall be mounted on an extended arm and be viewed through the front screen. The O/S mirror shall be mounted on an arm located at the front pillar and viewed through the drivers signal window. Arms shall be black, twin tube, nominally 28mm diameter to provide maximum stability and strength. Mirror heads to be black.

6.17 Windscreen Wipers

A "Heavy duty" wiper system is mounted at the top of the lower windscreen. The wiper system is set to wipe the maximum amount of screen (approx 58%) to give the best vision to the driver in poor conditions. The wiper system is driven by a heavy-duty motor accessed via a panel in the upper front bulkhead.

Control via steering column stalk to give intermittent, slow and fast speed settings.

6.18 Windscreen Washer

A 6.7 litre reservoir shall be located below the driver's cab floor area and shall be topped up by a fill neck located behind the battery access panel located at the O/S front of the vehicle.

The washer jets are mounted on the windscreen wipe arm.

6.19 Fluid indicator

An LED fluid indicator shall be positioned behind the fuel fill access panel. The indicator will notify workshop personnel if the vehicle is low on coolant, oil or screen washer fluid.

6.20 Towing

A threaded towing block for a 1" BSP towing eye shall be mounted to the front chassis cross member. The blocks shall be accessed by removing the centre portion of the front bumper.

Air charge points shall be located in the vicinity of the towing eye.

6.21 Mud-flaps

Mud-flaps shall be fitted to the rear of all wheelarches.

6.22 Branch deflector

A branch deflector shall be provided at the upper N/S front corner.

Material: Stainless Steel

Finish: Black

6.23 Reverse Alarm

A reverse alarm shall be fitted with a timed override switch in the cab.

6.24 Assault Alarm

An assault alarm shall be mounted within the front dash area. The alarm shall be activated by a button on the driver's offside console.

6.25 Fire suppression

A fully automatic fire suppression system shall be fitted in the main engine bay. Prior to activation of the system any fans in this area should be locked stationary and the engine should shut down within 10 seconds of activation. The fuel system to the engine bay will also be cut off on activation of the system. The driver will automatically be notified if the system is activated.

Make: REDACTED

6.26 Battery Charge Point

The vehicle shall be equipped with a Griptone battery charge point which is accessed within the drivers cab.

6.27 Engine Oil Dip and Fill

The engine oil dip and fill shall be located on the offside of the vehicle at the rear corner. These shall be accessed through a flap on the engine door

6.28 Coolant

The coolant fill points shall be located on the offside of the vehicle, above the main radiator.

6.29 Emergency Engine Stop

The emergency engine stop is fitted behind the engine oil dip and fill flap.

6.30 Paint finish -

Body - Red – DG FLT.00285

Highlight – Black – RAL 9005 DN DG

Roof – White - WRB.*0130 DN DG

Wheels – Indian Red – to match HMG F2605

6.31 Exterior Labels

Ref Stewart Signs Kit

All labels, signage and layout is to TfL approved design.

The glass throughout the vehicle shall meet all legal requirements and shall be identifiable by an E Mark on the interior of the glass.

7.1 Front Screen

There are 3 separate front screens all bonded in position and manufactured from 6mm laminated glass. The lower and destination screens, are manufactured from clear glass, while the upper screen is tinted automotive green with 80% light transmission. The upper screen is manufactured in 3 pieces and is jointed by alloy jointing strips.

7.2 Main Saloon

All saloon glass on both the upper and lower decks of the vehicle shall be toughened safety glass. The glass shall be bonded in position and shall be tinted automotive green with 80% light transmission.

No hoppers units shall be fitted.

Two windows on the upper saloon and two windows in the lower saloon shall be designated as emergency escape windows. These windows shall be fitted with a safety punch device.

7.3 Rear Window

The rear screen shall be manufactured in 3 separate pieces from laminated glass. The glass shall be bonded in position and shall be tinted automotive green.

7.4 Drivers Window

A drivers signalling window shall be a flush fitting unit with two sliding windows. The unit shall be bonded with clear glass. The main glass shall be 4mm, the sliding units shall be 10mm "Bandit Glass". Both glass units shall be tinted automotive green with 80% light transmission

7.5 Escape hatch

A break out escape hatch shall be provide in the mid upper saloon roof area to meet required legal regulations. The glass shall be toughened glass which has been blacked out. The escape hatch glass is broken by means of a safety punch. Access to the escape hatch is via a sacrificial ceiling panel with concealed push out hand holds to facilitate removal when required.

7.6 Anti-Vandal Film

An anti vandal film is applied to all passenger windows. The 100 micron, clear, polyester film has a scratch resistant coating.

The vehicle shall be equipped with three areas for entering and exiting. The vehicle has been configured such that it can operate in one of two modes; either as a three door vehicle where all three doors are under the control of the driver. Or with an open rear platform in which case the driver is assisted by a crew member located at the open platform.

8.1 Door 1

Located at the front of the vehicle shall be a Ventura inward gliding door with a clear opening between handpoles of 1110mm. The door shall be of electro/pneumatic operation and be fitted with a full depth clear toughened glass.

8.2 Door 2

Located mid wheelbase it shall be a Ventura double leaf sliding plug door with a clear opening of 1110mm. The door shall be of electro/pneumatic operation and be fitted with a full depth clear toughened glass.

8.3 Door 3

The rear platform area shall be equipped with a Ventura two leaf door which can be configured to operate in 2 modes:

- 1) As an open platform with both the front and rear door leaves locked in the open position.
- .2) As a functional door, operated from the drivers cab. In this mode the rear leaf will be locked closed and the front leaf shall operate as an inward gliding door leaf.

Both the front and rear leaves are held in position using air pressure. In addition the forward leaf includes a latch to locate the door in the open position.

8.4 Change-over of door 3 to open platform

The driver and crew member shall be able to change over the configuration of the vehicle. This is a two man operation requiring the driver to begin the sequence by pressing a 'crew' button on the side console and the crew can complete the sequence with an 'unlock' button housed within the switch panel at the rear platform.

8.5 Driver's Door controls

The doors shall be operated by push buttons housed on the driver's side console. There shall be a single button which shall

open all available doors, and an individual button to close each door.

The door status is visible within the drivers DMUX screen

8.6 Crew Controls

The crew shall be provided a 'drive', 'alert' and 'unlock' buttons located within recessed housing at the rear platform. When in Driver only mode the switches shall have no function.

8.7 Interior Emergency Controls

Emergency open/close buttons shall be located on the door shelf plate cover. The buttons for doors 1 and 2 shall be located behind individual hinged flaps. The buttons shall be of pneumatic operation.

8.8 Platform Lights

Each platform shall be illuminated by recessed spotlights, which are controlled by the door being open or closed.

8.9 Entry ramp

A power ramp will be fitted at door 2 to assist wheelchairs and disabled passengers. The ramp shall be stowed below the floor area and shall be recessed 35mm from the exterior body work. The ramp shall be only capable of being deployed when the vehicle has stopped, the driver engaged the parking brake and the door is closed. Once deployed the ramp shall activate an interlock which will prevent the release of the park brake until the ramp has been retracted.

The ramp will be fitted with an audible warning device that should not exceed a noise level of 75db(A). This shall sound in conjunction with flashing amber lights located on the side panels adjacent to the door.

The manual release tool is located on the floor behind the driver's seat.

Make and Model : REDACTED

8.10 Audible warning

When door 2 or the rear platform door are closing an audible warning device will sound that should not exceed a noise level of 75db(A).

Section 9 Interior Finish

The interior of the New Bus for London has been specifically design to complement the dramatic exterior.

9.1 Floor covering

The main saloons of the vehicle shall be fitted with anti-slip floor-covering with the minimum number of joints.

Colour – as per reference sample
Fire Retardancy -EEC 95/28.

The front and rear entrance areas, as well as the treads and risers on the two staircases and the luggage pen shall be finished with cork resin based flooring material. The cork material is finished with a machined groove pattern.

Colour – as per reference sample
Fire Retardancy –Class Two.

9.2 Step Edging

All the step edgings shall be Aluminium fitted with yellow infill.

9.3 Sidelining

On the upper deck easy clean laminate shall be fitted to the sidewall below the window line.

Colour Reference : as per colour reference sample.
Fire Retardancy: Class One and EC 95/28 annex 4

On the lower deck fibreglass moulding shall by used below the window line.

Colour Reference : RAL 3005.
Fire Retardancy: Class Two.

9.4 Cove Panels

All coves shall be manufactured from GRP and each cove will be individually hinged to give access if needed to any component housed behind it. There shall be an ABS infill strip forming a highlight feature along the length of the cove. This infill also functions as the AC vent.

Cove Colour: RAL 7044
Cove fire Retardancy: Class Two

Infill Colour: RAL 3005
Infil fire Retardancy: UL94V0

9.5 Centre roof

Centre roof panels shall be manufactured from perforated aluminium sheet and will have acoustic material mounted in the void behind them to reduce the interior noise levels of the vehicle.

Colour Reference : RAL 7044

9.6 Window cappings

The vertical window cappings shall be an ABS trimmed part, fire Retardancy meets UL94V0

Colour Reference : RAL 7044

Fire Retardancy :UL94V0

The lower horizontal capping shall be a two piece PCV extrusion.

Colour Reference : RAL 3005

Fire Retardancy: EC 95/28 annex 4

The upper horizontal capping shall be a one piece PCV extrusion.

Colour Reference : RAL 7044

Fire Retardancy: EC 95/28 annex 4

9.7 Upper Deck Front Bulkhead

The upper deck front bulkhead shall be manufactured from GRP.

Bulkhead Colour: RAL 7044

Fire Retardancy: Class Two.

The front bulkhead shall incorporate the iBus monitor and will feature an ABS infill strip matching the coves.

Infill Colour: RAL 3005

Infill Fire Retardancy: UL94V0

9.8 Front Destination Housing

The front destination housing on the upper deck shall be fitted with two access doors to provide access to the equipment behind. The smaller door on the O/S provides access to an electrical panel and the wiper motor. The larger door provides access to the front destination screen

The doors shall be locked with a SouthCo type fast-lead screw requiring a triangular key to operate.

Colour Reference : RAL 3005

Fire Retardancy- Class Two

9.9 Upper Deck Rear Bulkhead

The upper deck rear bulkhead incorporates the rear seat box and rear staircase partition. There are two access panels to provide access to the heater box and air chill condenser which are located behind the bulkhead. The access doors are locked required a triangular SouthCo key to operate.

Colour Reference : RAL 7044

Fire Retardancy : Class Two

9.10 Upper Deck Pulpit

The front stair well is protected through the use of a fibreglass pulpit which encompasses the main electrical centre located behind a locked access door

The doors shall be locked with a SouthCo type fast-lead screw requiring a triangular key to operate.

Colour Reference : RAL 3005

Fire Retardancy- Class Two

9.11 Seat boxes

The first seat forward of the both the front and rear staircases is mounted on a seat box . These units are used to house additional electrical equipment, such as the CCTV DVR. The doors shall be locked with a SouthCo fast-lead screw requiring a triangular key to operate.

Colour Reference : RAL 3005

Fire Retardancy: Class Two

9.12 Lower Deck Front Bulkhead

The lower deck front bulkhead shall be a fibreglass part which connects the door head cover of door 1 to the drivers overhead console. .

Colour Reference : RAL 7044 and infill RAL 3004

Fire Retardancy: Class Two

9.13 Door Head covers

The Door head cover above each entrance door shall house all the workings of the shelf plate. It shall be manufactured from GRP and shall lift away to give easy access to the door gear components. It shall be secured be two Southco quick release fasteners.

Doorhead Colour: RAL 7044

Cove fire Retardancy: Class Two

Infill Colour: RAL 3005

Infil fire Retardancy: UL94V0

9.14 Interior Mirrors

Two mirrors shall be fitted centrally to the front bulkhead. These shall permit the driver a view of both the wheelchair area and door 2 through the use of two 10" convex mirrors located within the saloon.

9.15 Fire Extinguisher

A fire extinguisher to EEC BSEN3 standard shall be supplied and fitted behind glass in the N/S cove directly behind the door 1. The extinguisher shall be accessible from the saloon area.

9.16 Licence Holder

A double licence holder shall be fitted to the front N/S pillar. It shall be situated in an area where it is easily readable from outside the vehicle.

9.17 Saloon lights

Lighting in the main saloon areas shall be provide by a series of LED spot lights recessed into the roof coves. Saloon lights shall have the ability to be turned on/off manually by the driver or work automatically using 'smart sensors' depending on the ambient light level.

9.18 Staircases

A forward facing, straight, 9 step staircase, manufactured from GRP shall be provided at the front of the saloon.

Colour Reference: RAL 3005

Fire Retardancy: Class Two

A turned staircase shall be provided at the rear of the vehicle. The staircase shall be manufactured from GRP.

Colour reference: RAL 3005

Fire Retardancy: Class One

9.19 Seating

Seating supplied to layout CUS-02351. Seating to meet all legally required dimensions. Meets Crib 7

Make: Rowan Telmac

Model: NBfL

Moquette: Camira NBfL

Frame Colour: Metallic Black

Back Rest Colour: Dark grey

9.20 Wheelchair Location

A wheelchair bay of minimum 1500mm long shall be provide as far forward

as possible on the O/S low flat floor area.

Padded backrest to be integrated into the saloon side of the staircase partition.

The wheelchair bay shall be designated through the use of a white border and a white wheelchair logo.

Offside horizontal handrail incorporates the wheelchair signal bell push.

9.21 Handpoles

Handpoles shall be manufactured from 35mm diameter, smooth mild steel, and coated with a non slip finish. Handpoles supplied as per drawing CUS-02351 to meet all legal requirements.

Colour Reference: as per reference sample

9.22 Bell pushes

Positioned as shown in drawing CUS-02351. NBfL bespoke design

9.23 Bus Stopping

Three bus stopping signs are incorporated as part of the IBUS system. One screen is located on the upper deck facing rearward. Two are fitted on the lower deck one facing forward and one facing rearward.

9.24 Crew Locker

A locker shall be provided at the rear platform area for a 2nd crew member. This will be secured by means of a SouthCo type lock requiring a square key.

9.25 Smoke detectors

A concealed smoke detector shall be provided in the upper deck rear seat area and shall be linked to an audible warning in the driver's cab.

9.26 Emergency Isolator

Fitted in cab

9.27 Luggage area

Over nearside front wheelarch, finished with cork type flooring material and fitted with a guard rail.

Section 10 Drivers Compartment

10.1 General

GRP mouldings shall form a totally integrated design incorporating front bulkhead, heating and ventilation instrument console, switches, controls and ticket equipment plinth. The rear of the cab area shall be formed by the staircase closure panel.

10.2 Cab Door

Double skinned, and complete with lockable door latch top security latch and full height assault screen incorporating speech holes. The screen is to be manufactured from an approved polycarbonate.

10.3 Assault screen

A full height screen mechanically secured top and bottom will run from the cab door assault screen to the front N/S pillar to fully enclose the drivers cab area. The screen shall hinged from the NS pillar to allow access for cleaning. Access is provided through the screen for the driver's ticket machine/validator. The screen is to be manufactured from an approved polycarbonate. The screen is locked into place with electro-magnetic catches, the release switch is positioned in the driver's cab.

10.4 Drivers Seat

Standard: Chapman Nova Urban Drivers seat moquette trimmed. Seat equipped with:

- Recline mechanism
- Lumbar support
- Non-heated
- Double locking slides
- Mounted on a pedestal and a mechanical suspension unit

Moquette Colour Reference: TBC

Option : Leather in place of moquette

Option: Operator specific drivers seat

10.5 Drivers Controls

The ceiling of the drivers cab shall incorporate the radio equipment, iBus controller, destination controller, additional switches, microphone, speaker and monitors required by the driver. Additional regularly used switches etc. shall be mounted on either the driver's side console or around the dash console. All switches shall be within easy reach of the driver.

10.6 Cab lighting

LED spot lights provided to give light to the driver and specifically to the ticket machine area. The lights shall be wired through the entrance door micro switch and also a separate switch on the instrument panel to allow either automatic operation, when the sidelights are on, or manual operation by the driver.

10.7 Sun Visor

A 1 metre wide x 600mm drop sun visor shall be provided for the driver.

10.8 Coat Hook

A double coat hook shall be fitted at the rear of the drivers cab area.

10.9 Cab Bell

A bell, combined with warning light, will be fitted in the drivers cab area and shall operate in accordance with legal requirements when a saloon bell push is pressed. The bell shall ring only once in the cab, subsequent bell pushes to illuminate warning light but bell to ring only in passenger compartment

10.10 Night Lights

When the master switch is turned off the entrance and cab lights will come on for a 1-minute period to allow the driver to leave the vehicle safely at night. The lights shall also come on when the master is switched off and the exterior entrance door button is activated.

10.11 Cash Handling

A cash tray shall be provided on the top of the drivers cab door together with provisions for attaching a cash bag on the inside of the cab door.

Section 11 Ticketing, CCTV & Communication Equipment

11.1 Ticket Equipment

Provision shall be made to mount TfL supplied ticket machine and Oyster validator equipment at the drivers cab area.

Three remote oyster card readers shall be supplied by TfL and shall be mounted at each entrance/exit door areas, as defined on CUS-02351

11.2 Communication

A passenger announcement system shall be provided to be used by the driver . The equipment shall be supplied as part of the Free issue iBUS system. A cable shall be fitted between the PA and the conductors area for future expansion.

Four discrete speakers shall be supplied in each saloon.

Induction loops (T band) shall be provided to allow passengers with hearing aids to hear clearly the PA or iBUS systems.

11.3 CCTV

CCTV camera layout as per drawing reference: CUS-2680. There are two options for the position of the camera recording the cab view. Operator can specify which position is required.

The Operator shall be responsible for selecting the CCTV equipment. This must be compatible with the technical requirements set out in Attachment 14 of the current Operational Performance Specification published by TfL.

11.4 Drivers Surveillance

Fitted to meet legal requirements. The cameras shall function when the master switch is on and shall be viewed from two monitors mounted in the drivers cab roof.

The Operator shall be responsible for selecting the Driver's Surveillance equipment. The operator is responsible for any consequential costs due to modifications required if the selected equipment does not fit in the provided location.

11.5 Passenger Monitors

Two passenger viewable 10in monitors are to be fitted into the lower deck. These will cycle between camera views. Position as follows:

1. In the inward facing access panel of the front staircase
2. In the conductors locker door at the rear staircase.

The Operator shall be responsible for selecting the Passenger Monitors equipment. The operator is responsible for any consequential costs due to modifications required if the selected equipment does not fit in the provided location

11.6 iBus

iBus system shall be provided by TfL and installed into the vehicle. The system comprises:

- 1) Drivers Control Unit – located on the drivers overhead console
- 2) Lower Deck Rear facing Sign – Located and integrated on the rear wall of the front staircase partition
- 3) Lower Deck front facing sign – Located in a bespoke unit located forward of the rear platform
- 4) Upper Deck Sign – Located and integrated into the upper deck front bulkhead
- 5) Main Unit – Located in the front seat box

Section 12 Destination Equipment

Destination equipment shall be fitted to the vehicle, comprising :

12.1 Front

A power operated blind, LED lit, destination and route number unit shall be fitted above the front windscreen screen.

12.2 Side

A power operated blind, LED lit, destination unit shall be fitted at the front door at the top of the adjacent window bay.

12.3 Rear

A power operated blind, LED lit, route number unit shall be fitted behind the saloon window on the centre line of the vehicle.

12.4 Signage

All display signage will meet as a minimum the size requirements given in Attachment 13 to TfL's Operational Performance Specification. Text shall be in TFL classic Johnston bold font, white text on black background. The vehicles will be supplied with route specific destination blinds fitted, subject to information being supplied in time.

12.5 Control Unit

Destination and Route Controller, fitted in the driver's overhead console.

Section 13 HVAC Equipment

13.1 Cab Heating

A heavy duty, twin speed air blend heating and demisting unit incorporating an air filter shall be supplied. The unit will also act as drivers A/C. Air will be ducted to the front screen and cab area via a combination of vents and eyeballs in the front dash area. The unit shall be powered only when the ignition is on. Maintenance access is through the centre front bumper section, which can be hinged or detached if necessary.

13.2 Saloon heating/ cooling

The vehicle shall be heated by a twin blower system fitted in the upper saloon. The upper deck shall be heated by a fresh air blower situated at the rear seat box and blowing air down the N/S floor vent. The lower deck shall be heated by a blower mounted below one of the upper deck seats blowing re-circulated air into the O/S roof cove duct.

Upper deck cooling shall be provided when necessary by an 11KW, A/C system blowing cooled air through roof cove vents on both the N/S and O/S of the vehicle.

Temperatures shall be controlled in each saloon by separate thermostatic controls which will turn heating and cooling systems on automatically when required by the set temperature limits. Limits and Performance are outline in contract PRO1632.

Appendix A Vehicle Images



Summary Spec iss d
images.pdf