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Document Motivation

Parking Guidance Systems are gaining popularity. Already we are seeing that architects specify these systems at the design stage. Retrofit inquiries and installations are on a steady growth. We at Joint Ventures Electronic Services believe that in a decade Parking Guidance Systems will be the norm rather than the exception.

Unfortunately, to date there is no industry-dedicated standard that will ensure uniformity and quality of Parking Guidance Systems across the various vendors.

This results in a variety of systems with different design philosophies. Each design with the designer preference with whatever experience and with the technology that was available where and when the design was made.

Having said the above it must also be understood that Parking Guidance Systems are not difficult to realize and they represent no technological breakthrough. While most systems do offer the basic functionality they do differ in price, typology, accuracy, installation processes etc.

This poses a problem to prospective customers and parking consultants when specifying Parking Guidance Systems. In many cases the consultants will get specifications of one or two systems and use them to draft the tender documents.

This practice may compromise the benefit of the final customer as it may exclude a vendor with a system, which is just as good or maybe even better or cheaper just because that vendor made engineering decision different to the specified one.

In some tenders we encountered specifications such as:

- The system will use SMD RGB LEDS.
- The system will utilize the CAN Bus protocol Version 1.2.5 (12 February 1997)
- All numeric digits shall be displayed using Amber AlInGaP II LED's with a wavelength of 590nm± 3nm and each LED shall have a typical brightness of 5.2 candelas with 32^{O} focus angle.
- The controller shall have 8x digital and analog ports to monitor the status of the power in the case of backup power supplies, the door status as well other parameters, which may need monitoring.

Such specifications are evidently system specific and are based on arbitrary engineering decisions that where made by the system's engineer. They are not necessarily the best, cost effective solution to the system.

But, as mentioned, they exclude other solutions by other vendors that may be better or cheaper to the detriment of the final customer.

The following document is a suggested specification for Parking Guidance Systems:

- It highlights all the important points that a PGS should have.
- It Allows room for engineering decisions.
- It gives the consultants a healthy selection of vendors and systems.

The following document includes the compliance statement of the Diamond Parking Guidance System. In cases that require site information, we assumed an imaginary site as follows:

- 1200 sensors.
- 3 levels
- 12 Numeric displays with 3 digits.

This document is also available as a word document for download, please copy and edit freely.

The following document uses the terminology as defined in the PGS – Terminology .Pdf

PGS – Recommended Technical specifications

Content

1. System - Overall requirements

The main objective of the Parking Guidance System is to continuously advise the users of available parking across the various sections, zones, blocks, levels and/or allocations and/or the entire site.

Secondary objectives are data collection and statistical analysis in order to optimise the usage of the site.

1.1 The proposed Parking Guidance System shall be **fully modular**. Any modifications to the system size and structure at the design stage such as:

- Additional/Removal of sensors.
- Additional/Removal of Way-Finding devices.
- Restructuring of Sections, zones, blocks and/or Allocation of bays

The above should be possible without any added cost above the initial cost of the unit and its installation, as per the quote. No extra commissioning, restructuring, reprogramming will be charged for, unless stipulated in the letter of compliance.

Comply – The Diamond PGS is literally a Plug & Play system. Any addition or removal of any of its component is automatically detected and configured. There will be no added costs for such modifications over and above the quote per device as quoted.

1.2 The proposed system must allow for future expansions and modifications. There will be no added costs above the cost of the added device and its installation. No extra commissioning, restructuring, reprogramming will be charged for, unless stipulated in the letter of compliance.

Comply – Any added component will be charged for as per the tender quote. There will be no added costs for restructuring or reprogramming. However there will be callout fee at our standard rate.

1.3 The proposed system shall allow **progressive installation and activation** so that the whole system can be installed, commissioned and be up and running section by section, zone-by-zone and/or block-by-block.

Comply – The Diamond PGS is fully modular. Each Section, Zone or Block, with its Way finding devices, can be installed, commissioned and activated independently and independent of the rest of the system and of the control room.

1.4 The system will operate independent of the control room. Local controllers with embedded intelligence per zones or per level must compute the available spaces and update the respective way finding devices in real-time.

Comply – The main function of the Diamond PGS ZoneBuffers and the BlockBuffers is to control the entire system locally, independent of the control room and of one another. They also act as data concentrators relative to the control room.

1.5 Full control of the system must be possible from the control room.

Comply – The control room can control every single sensor and way-finding device.

1.6 All the hardware must comply with the following standards:

- IEC 60950-1 safety Standard.
- IEC 61000 RFI/EMI Standard.

Please attach certificates by accredited test laboratory such as SANS accredited bearing the SANS mark.

Comply – Certificates are available on our website www.jves.co.za

1.7 The proposed system must have very **low power consumption** for a low carbon footprint. Please expand in a form of a table the power consumption mainly:

- Per Sensor.
- Per Way-Finding devices (The consumption for the way finding devices must be at lamp test mode)
- Per data concentrator/ZoneBuffer/BlockBuffer
- Per the proposed system.

Comply – The Diamond Parking System is of the lowest power consumption of any other system that we are aware of.

Sensor	3 digit Numeric	Zone/Block Buffer
300mW	28W	250mW

For a system of 1200 sensors 12 numeric displays and 10 Zone/Block Buffers:

1200 sensors	12 Numeric displays	12 Zone/Block Buff.	Total system
360W	336W	3W	699W Max

1.8 The proposed system must take all **height considerations** into account. Should the ceiling be too high, a type of cable tray or trunking must be suspended from the ceiling. Please expand.

Comply – The Diamond PGS offers a unique solution for suspended system using our dedicated trunking system. Please refer to the attached document "PGS – Trunking System.Pdf"

1.9 All cabling must be installed in a **proper cable way** such as cable trays trunking and/or conduits - No exposed cables will be allowed! Please expand.

Comply – Most of the system is installed inside our dedicated trunking system. As required, we may use other cableways such as conduits and cable trays. No exposed cables will be seen.

1.10 The system should be a complete specialized car park guidance product with proper documentation and support tools. It should not be a collection of different products from different companies without clear indications of future support. Please submit a complete list of manufacturers if applicable.

Comply – The entire system was developed, manufactured, installed and supported by Joint Ventures Electronic Services.

1.11 The system shall preferably be manufactured in South Africa.

Comply – The entire system was developed, manufactured by Joint Ventures Electronic Services, Johannesburg, South Africa.

1.12 A complete maintenance of the system shall be undertaken locally. This includes all repairs and replacement units.

Comply – The Diamond Parking Guidance System is installed and supported countrywide by EOH Holding Limited. Local stocks are always available.

1.13 By definition Parking Guidance Systems starch over large areas and long distances. This makes manual inspection for fault difficult. An advantage will be an automatic fault detection, notification and service request. Please expand.

Comply – The Diamond Parking Guidance System has a build-in test. Upon detection of fault or degradation the system raises a flag at the control room and sends an SMS to the service centre. In addition the fault is logged.

1.14 The proposed system must be able to fully **self-recover** upon a power failure. Please expand

Comply – All hardware will fully recover to normal operation upon power recovery.

1.15 The proposed system must come with a three years unconditional guarantee.

Comply – The Diamond Parking Guidance System comes with three years unconditional guarantee. All faults will be repaired and all units will be replaced with the only exclusion of physical damage.

1.16 The proposed system must be of **industrial grade**. It must be able to operate in temperature between -20°C and +70°C.

Comply

1.17 All documentation such as detailed datasheets of all the components are to be submitted.

Comply

1.18 As part of the tender, the contractor shall include a set of all hardware devices to be used for the project. The sample must be in working order.

Comply – Attached is our Micro-Demo system assembled in the actual installation gear. It includes 3 sensors, one numeric display, one ZoneBuffer and one Power supply.

2. Sensor requirements

2.1 Each parking bay shall be fitted with an individual bay-monitoring sensor. The proposed system should offer the following types of sensors:

- Combination sensors – Sensor and Space indicator integrated in a single unit. To be used in areas with a reasonable view from the driveway to the middle of the parking bay where the sensor is located.
- Split sensors - Sensor and Space indicator housed in two different units with proper communication between them. To be used in areas with obstacles such as columns, storage rooms or lift shafts, which obstruct the view from the driveway to the middle of the parking bay where the sensor is located.
- Slave sensors – In cased of wide or long bays, such as a paraplegic parking bays or parallel parking bays, a secondary slave sensor (or sensors) should be used in order to cover the wider/longer area.

Comply – The Diamond PGS offers all three options.

2.2 Each sensor must be logically assigned to a:

- Section – A geographical area such as a lane or aisle.
- Allocation - A group of users such as Paraplegic, VIP, Hybrids etc. The allocated bays may be scattered across sections zones and/or blocks.

Allocated bays may be scattered around in different locations.

Comply

2.3 Each sensor shall have a unique identification address within the entire system. This address will be used when communicating with the sensor in order to retrieve its status or when setting it.

Comply – Each Diamond PGS sensor is uniquely addressable.

2.4 The sensor shall have better than 99% accuracy.

Comply - Diamond PGS sensor achieves close to 100% accuracy

2.5 The sensor must be able to operate in a stand-alone mode.

Comply – Each sensor can operate independently of the greater system.

2.6 Each sensor must be fitted with built-in test. In the case of a fault, the sensor must indicate the condition via LED and notify the control room. Please expand.

Comply – Each sensor is equipped with build in test. The health of the detection circuit and internal voltages are verified on an ongoing basis. In a case of fault, the condition will be indicated using the status LED and will be relayed to the control room.

2.7 Each sensor must be fitted with a statue LED or LEDs. The minimum requirements are:

- At list one LED must blink to indicate a live sensor.
- The sensor must indicate whether it is being communicated with.

- The sensor must indicate the sensor health status based on any diagnostics.

Please expand.

Comply – The Diamond PGS Sensor uses a bi-colour LED as a status indicator as follows:

- **Rapid Green random blips – Sensor OK, Communication OK.**
- **Rapid Red random blips – Sensor OK, No communication is received.**
- **Green blip followed by red blip - Sensor indicates a problem, Communication OK.**
- **Two red blips – Sensor indicates a problem, No communication is received.**

2.8 The sensors must have communication link to the control room for operation verification.

Comply – the control room monitors all the sensors at fixed intervals. Should a sensor detect a problem,

- **A flag will be raised at the control room notifying the operator.**
- **The fault will be logged.**
- **The system will automatically request service via SMS to the service centre.**

2.9 Sensors shall be hot swappable, without the need to switch off the system.

Comply

2.10 Sensors shall easy to replace. Please expand.

Comply – Replacing a sensor takes less than a minute

- **Mechanically - the sensors are simply clicked into the trunking system.**
- **Electrically – Two simple connectors are used to connect the sensor to the system.**

3. Space indicator requirements

3.1 Space indicators will be used in order to signal space availability. A red LED will indicate occupied space and the second colour, as follows, will indicate an available space:

- Green – General usage bay.
- Blue – Paraplegic allocated bay.
- Yellow – Hybrid car bay with charging facility.
- White – VIP or visitor bay.

Each bay will have its own space indicator, no shared indicators are allowed!

Comply

3.2 The standard Space indicator must have a 360^{O}-viewing angle without dead spots. The following are the minimum requirements:

- Maximum pick intensity pointing parallel to the driveway:
- A ratio of not less than –3db (-50%) between the pick and lowest intensities measured from a distance of 1m.

Please specify the **Minimum and Maximum** Luminous intensity [mcd units] measured at 1m distance and the total Luminous flux per the various colours Red, Green, Blue, White and Yellow. Use the following table.

Colour	Max Luminous intensity	Min Luminous intensity	Total Luminous flux
Red			
Green			
Blue			
Yellow			
White			

Comply – The Diamond PGS offers an elliptical light distribution pattern with no dead spots as standard

Colour	Max Luminous intensity	Min Luminous intensity	Total Luminous flux
Red			
Green			
Blue			
Yellow			
White			

3.3 The proposed system will offer space indicators that will be clearly visible against direct skylight. This is required for bays situated against open windows. Please expand using the recommended table.

Comply – The Diamond PGS offers a spherical light distribution pattern with 180^{O} light distribution pattern specially designed for direct skylight applications.

Colour	Max Luminous intensity	Min Luminous intensity	Total Luminous flux
Red			
Green			
Blue			
Yellow			
White			

3.4 The brightness of the space indicator shall be able to be set to at least 3 different levels including FULL, DIM and OFF. This requirement is aimed at energy conservation during nights, weekends and holydays.

Comply - The Diamond PGS space indicators offer a 15-stage dimmer facility.

3.5 Other features of the indicator such as OFF mode or Blink may be an advantage, please expand

Comply - The Diamond PGS space indicators may be set to one of the following modes:

- **Normal**
- **Permanently Off**
- **Permanently Red**
- **Permanently Green.**
- **Blink normal**
- **Blink red**
- **Blink green**

4. Way finding devices requirements

4.1 The main objective of the Parking Guidance System is to continuously advise the users of available parking. The contractor, having studied the site layout may offer a guidance system best suited for the proposed system.

The Diamond Parking Guidance System offers two types of guidance signage, namely:

- **Numeric displays.**
- **Guiding arrows.**

In most cases we recommend the numeric displays and as such, the system was designed to deal with a large number of them effortlessly. In addition the offered displays are very competitive.

We do not recommend arrows as these have inherent logic issues at a system level. Please refer to the attached "arrows Vs. Numeric display. Pdf" document for more details.

4.2 All Way-Finding devices must have a static and dynamic display area:

- The static area describing the geographical area associated with the device.
- The dynamic area providing the actual variable information.

Comply

4.3 All Way-Finding devices will offer a viewing angle of at least 90^{O}. The viewing angle is defined as the –3db (50%) intensity angle.

Comply

4.4 An advantage will be a multi-colour display with green numeric display indicating high parking availability and red indicating low availability or no parking at all.

Comply – The Diamond Parking Guidance System numeric display implement a three colour scheme:

- **High availability – Green indication.**
- **Low availability – Orange indication.**
- **No availability – Red indication.**

4.5 Numeric displays must be available in 2, 3 and 4 digits.

Comply

4.6 All Way-Finding devices must have a digit high of not less then 100mm.

Comply – We offer 100mm and 200mm height character displays.

4.7 All Way-Finding devices must have a rating of IP65, in case of outdoors mounting.

Comply

4.8 Each Way-Finding device must be fitted with built-in test. In the case of a fault, the device must indicate the condition via LED and notify the control room. Please expand.

Comply – Each way finding device is equipped with built-in test. The health of all segments and internal voltages are verified on an ongoing basis. In a case of fault, the condition will be indicated using the status LED and will be relayed to the control room.

4.9 Each Way-Finding device must be fitted with a status LED or LEDs. The minimum requirements are:

- At list one LED must blink to indicate a live and operational device.
- The way finding device must indicate whether it is being communicated with.
- The way finding device must indicate its health status based on any diagnostics.

Please expand.

Comply – Each Diamond PGS way finding device uses a bi-colour LED as a status indicator as follows:

- **Rapid Green blips – Device OK, Communication OK.**
- **Rapid Red blips – Device OK, No communication.**
- **Green blip followed by red blip - Device indicates a problem, Communication OK.**
- **Two red blips – Device indicates a problem, No communication is received.**

4.10 The way finding devices must have a communication link to the control room for operation verification.

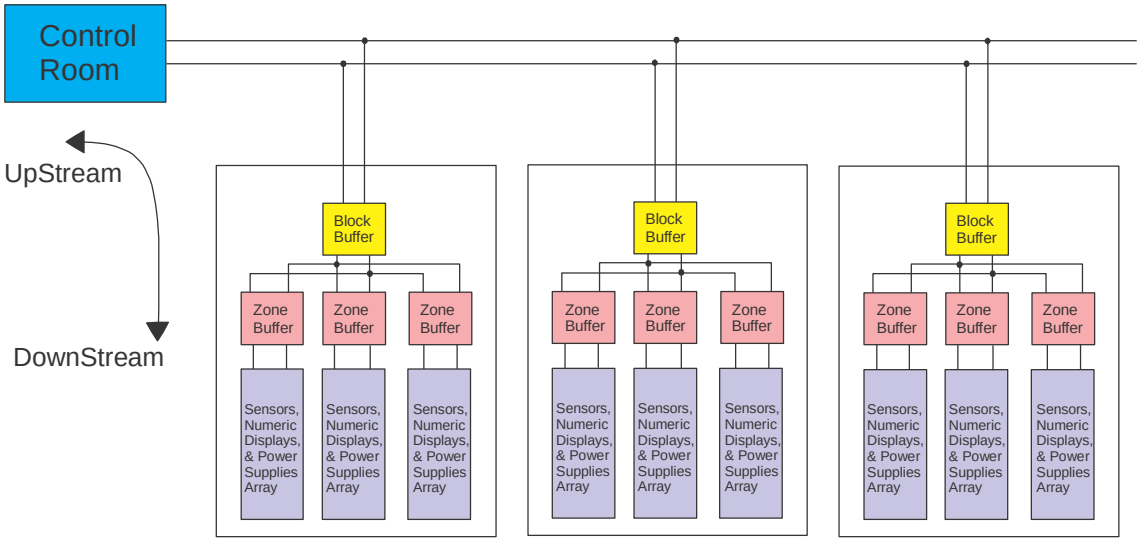
Comply – the control room monitors all the way finding devices at fixed intervals. If a device detects a problem:

- **A flag will be raised at the control room notifying the operator.**
- **The fault will be logged.**
- **The system will automatically request service via SMS to the service centre.**

5. Data concentrator requirements

5.1 Data concentrators are to be used as data buffer between the floor devices (sensors, way finding devices, zone counters) and the control room. Please expand, number of devices and structure.

Comply – The Diamond PGS employs hierarchical data collection architecture with ZoneBuffers as a first line device and a BlockBuffer as second line device.



For the proposed site of 1200 sensors, across three levels we estimate the use of 3 ZoneBuffers and 1 BlockBuffers per level. A total of 12 data buffering devices.

5.2 Each Data concentrator should be able to communicate with a number of sensors and way finding devices via its downstream communication ports.

Comply

5.3 Each Data concentrator shall be able to communicate with the control room via its upstream communication port/ports.

Comply

5.4 Multiple Data concentrators shall connect back to the central control system.

Comply

5.5 The system will allow full data collection to the control room. The poll rate will be at least once every 3 seconds.

Comply

5.6 Data concentrators must be fitted with status LEDs. These LEDs shall show the communication status on all communication ports.

Comply

5.7 The Data concentrator should be mounted neatly, and allow clear visibility to the status LEDs

Comply – The Diamond PGS ZoneBuffers and BlockBuffers form an integral part of the mechanical system, they simply click into the trunking system.

6. Power supply requirements

6.1 The system will be connected to the standard power grid. Please expand on the number of sensors per power supply and the number of power supplies required for the proposed installation.

Comply – The Diamond PGS uses standard, off the shelf, 100W power supplies.

A single 100W power supply can support up to 250 sensors.

Theoretically 6 power supplies are needed to run the 1200 bay site but practically we will use 3 per level in order to reduce cabling length.

6.2 The system will allow power supply redundancy in case of power supply failure; no power supply failure may disrupt the system or any part thereof.

Comply – All power supplies are connected in parallel via an appropriate switch, No performance degradation will be affected even if 40% of power supplies are not operational.

6.3 Each power supply must be fitted with a statue LED or LEDs. The minimum requirements are:

- At least one LED must blink to indicate a live power supply.
- The LED must indicate whether the power supply is being communicated with.
- The LED must indicate the unit's health status based on any diagnostics.

Please expand.

Comply – The Diamond PGS Power supply uses bi-colour LED as status indicator. The LED blips three blips as follows:

- **First blip - communication blip:**
  - **Green - Communication is received.**
  - **Red - Communication is not received.**
- **Second blip – Voltage blip:**
  - **Green - Voltage within range**
  - **Red – Voltage is not within range**
- **Third blip – Current blip:**
  - **Green – The power supply delivers current.**
  - **Red – The power supply does not deliver current.**

6.4 The power supplies must have communication link to the control room for operation verification. The verification must include voltage as well as current contribution to the array.

Comply – the ControlRoom monitors each power supply at fixed intervals for proper operation. If a device power supply detects a problem:

- **A flag will be raised at the control room notifying the operator.**
- **The fault will be logged.**
- **The system will automatically request service via SMS to the service centre**

6.5 The Power supply should be mounted neatly, and allow visibility the status LEDs

Comply – The Diamond PGS Power Supplies are enclosed in a neat, small container. They can be mounted on walls or on the ceiling.

7 System control requirements

7.1 The entire system must operate independently of any control room.

Comply – The ZoneBuffers and the BlockBuffers act as local control of the system as well as data collection media.

7.2 Each level must operate independently of the other levels.

Comply – Each ZoneBuffer and each BlockBuffer collect data from their downstream array and control the way finding devices attached to them, regardless of the operation of neighboring units and or the greater system.

8. Control room requirements

8.1 The control room equipment shall include the following.

- Personal computer of a known brand (HP Dell, Lenovo etc.), with the following minimum specifications:
  - Processor
  - HDD
  - Ram
- Display – 27" LED/LCD display capable of displaying the parking information.
- Communication gateway device– single or multiple communication interfaces, capable of connecting the PC with the entire system.

Comply - The system will be supplied with a branded PC and a 27" VGA screen.
A "Diamond PGS USB Gateway" device will connect the PC to the entire system.

8.2 The control room software must be a stand-alone application free of any license fee for any number of installations per site. Please expand.

Comply – The Diamond PGS Control room is supplied free of charge. JVES only charges for the adaptation of the software to your specific site.

The application including its upgrades can be downloaded off our website and installed without any limit.

8.3 The control room software must have a schematic replica of the top view of the site in a clear, geographically referenced manner. The replica must clearly show the division of the site to blocks, zones and sections. Also allocations must be clearly marked with their color codes. Multiple screens with screen selectors may be used as required.

Comply.

8.4 The control room software must collect all the data relating to all sensors and zone counters at real-time.

Comply – All the data is collected every 2 seconds.

8.5 The control room software must display all sensor and way finding device status on the schematic replica at real time.

Comply – All screens are updated every two seconds.

8.6 The control room software must log every movement as it happens. Each log must include bay ID and time stamp. Backup system must also be provided. The log must be into any standard file format. Please expand.

Comply – Every movement is logged into standard CSV files.

8.7 The control room software must provide occupancy graphs relating to any number of bays during any day, week or month. Please expand.

Comply – Any combination of bays from a single bay to the entire site can be selected. The occupancy information can then be displayed for any hour, day, week or month.

8.9 The control room software must provide reports relating to any number of bays during any day, week or month.

Comply – Any combination of bays from a single bay to the entire site can be selected. The occupancy information can then be reported for any hour, day, week or month in one of the following formats

- **Detailed format – With every movement detailed.**
- **Summery format – With statistical information**

8.10 The control room software must export data relating to any number of bays during any day, week or month to CSV files for further processing should it be required.

Comply – Any combination of bays from a single bay to the entire site can be selected. The occupancy information can then be exported to CSV file for any hour, day, week or month. The CSV file can be read by any spreadsheet or database for further processing.

8.11 The control room software must have at least two access levels:

- Operator access level.
- Configuration access level.

Each access level must have its own password.

Comply

8.12 The control room software must automatically relay any fault as it is reported by any diagnostics to the operator and to the technician in charge via pop-ups, email or SMS. Please expand.

Comply – The status of the system is analyzed once a minute. Should a fault be detected the following will happen:

- **A popup will be raised alerting the operator.**
- **The fault will be logged.**
- **SMS will be sent to the service center.**

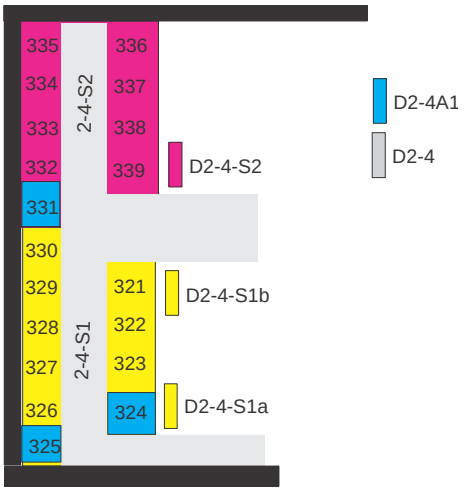
9. Documentation equipments

In addition to the standard hardware and software documentation the contractor will supply the following documents:

1. Geographical drawing detailing every section, zone and block.
2. Clear bay to numeric display reference in a table format.

Comply

The following is an example of a two sections with their relative displays followed by a table



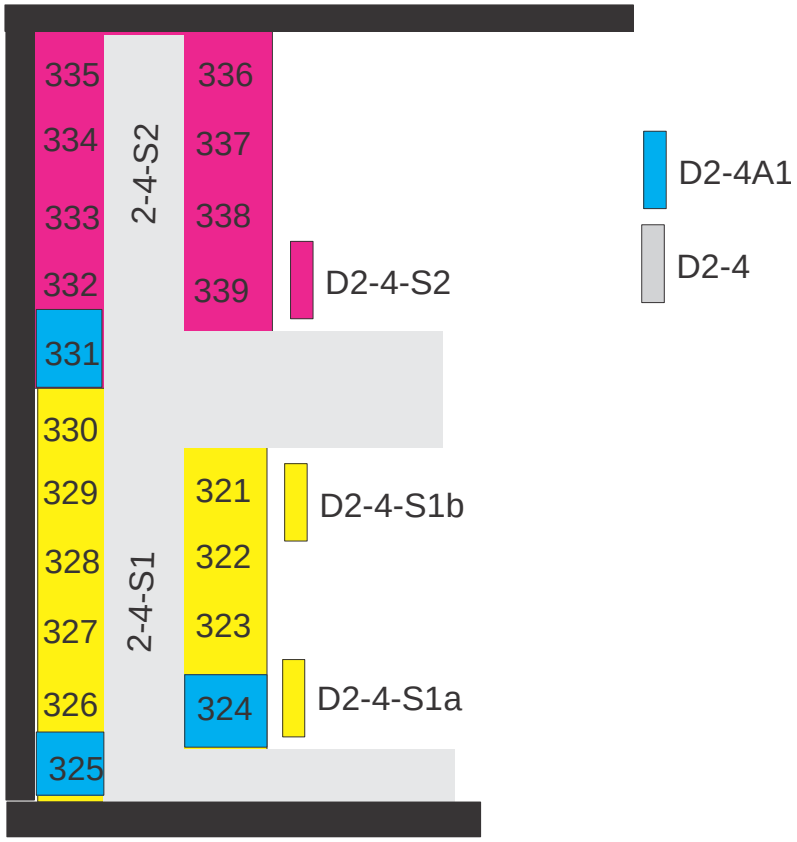
Bay information					Effected numeric displays			
Bay no.	Block	Zone	Section	Alloc.	Num ID	Num ID	Num ID	Num ID
322	B2	Z4	S1		D2-4-S1a	D2-4-S1b		D2-4
323	B2	Z4	S1		D2-4-S1a	D2-4-S1b		D2-4
324	B2	Z4	S1	P1			D2-4-A1	
325	B2	Z4	S1	P1			D2-4-A1	
326	B2	Z4	S1		D2-4-S1a	D2-4-S1b		D2-4
327	B2	Z4	S1		D2-4-S1a	D2-4-S1b		D2-4
328	B2	Z4	S1		D2-4-S1a	D2-4-S1a		D2-4
329	B2	Z4	S1		D2-4-S1a	D2-4-S1a		D2-4
330	B2	Z4	S1		D2-4-S1a	D2-4-S1a		D2-4
331	B2	Z4	S2	P1			D2-4-A1	D2-4
332	B2	Z4	S2		D2-4-S2			D2-4
333	B2	Z4	S2		D2-4-S2			D2-4
334	B2	Z4	S2		D2-4-S2			
335	B2	Z4	S2		D2-4-S2			D2-4
336	B2	Z4	S2		D2-4-S2			D2-4
337	B2	Z4	S2		D2-4-S2			D2-4

10. Testing procedure prior to handover

The system will be tested as follows:

10.1 The contractor will park a car or any other simulating object in each and every parking bay and verify its effect on:

- The space indicator.
- Respective numeric displays.
- Control room display.



For example:

- A vehicle will be placed in bay 327 – the effect will be observed on displays D2-4-S1a, D2-4-S1b and D2-4.
- A vehicle will be placed in bay 331 – the effect will be observed on displays D2-4A1.

All test will be recorded.

10.2 The system will be tested under live conditions for two weeks during which all aspects such as accuracy and stability will be inspected.

11 Sample system and/or Pilot installation

11.1 The tenderer will prepare and deliver a mini, desktop system that will be as true as possible to the final system.

The mini system will include:

- A few sensors of various types as suggested.
- One numeric display.
- All power supplies and data routers to make the system running.

In addition, the units will be mounted and wired as per the final installed product. This will enable us to asses the quality of the proposed system, its components and installation method.

Comply – A sample system can be delivered with a day's notice.

11.2 The tenderer will be prepare and deliver and install on site a mini system that will be as true as possible to the final system.

- A few sensors of various types as suggested.
- One numeric display.
- All power supplies and data routers to make the system running.

Such system must be installed using the same methods and hardware as the proposed installation method.

Comply – A sample system can be installed with a week's notice.

11.3 The tenderer may be asked to appear in front of the adjudicators, deliver a presentation, and answer questions.

Comply – Our representative will be available at any stage and present the advantages of the Diamond Parking Guidance System.

12 Quoting format

Different system uses different typologies, different data collection devices, different power delivery system, different wiring schemes etc. Also Different systems require different effort when installing and commissioning.

We, as the customer, are mainly interested in the functionality of the system. We need not to be bothered with the number and type of power supplies, the length and type of cable, number of screws used etc.

The tendered will calculate all of these costs into **a per-bay price** and **a per-display price**. All **installed, commissioned and running**.

The quote should be in a table as follows:

Description	Qty.	Price per unit	Total
Sensor unit combo Red/Green - Installed			
Sensor unit combo Red/Blue - Installed			
Sensor unit split Red/Green - Installed			
Sensor unit split Red/Blue - Installed			
Numeric display - 2 X Digits - Installed			
Numeric display - 3 X Digits - Installed			
Numeric display - 4 X Digits - Installed			
PC including screen	1		
Control Room software	1		
Grand total			

Should your system need items that cannot be allocated to the above, quote these items on a separate table with motivation.