



قطر تستحق الأفضل
Qatar Deserves The Best

Prepared for:

هيئة الأشغال العامة
PUBLIC WORKS AUTHORITY

TECHNICAL BRIEFING NOTE
ITS Gantries Design Requirements
04 Nov 2015

Prepared by:
Road Design Department

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1 OBJECTIVE

The objective of this technical memorandum is to provide interim, conceptual ITS gantry design examples. These design examples are intended to provide guidance for designers on how additional safety, maintainability, accessibility and constructability improvements may be achieved. It is expected that in line with these drawings formal standards will be updated in due course.

2 BACKGROUND

The ITS program in Qatar is currently being implemented on over 30 expressways and some 200 additional local roads projects. The ability to inform the driving public about travel times, road conditions, speed limits and lane use, whilst they are using the road network requires the use of electronic signage.

Overhead installations (i.e. Gantries) are therefore a critical element in the ability to provide this level of driver information. Gantries therefore, through the provision of Dynamic Message Signs (DMS) and Lane Control Signs (LCS), are a critical infrastructure element required for the management of traffic incidents or events. The placement and type of Gantry has a direct impact on both message types and message view ability by drivers on the road network and therefore on choices that drivers make.

These gantry locations are therefore required to be carefully chosen to be able to disseminate information to drivers about current traffic conditions to allow them to make more informed decisions.

It is expected that LCS equipment will be installed at approximate 500 meter intervals on the main expressways (managed corridors), and each lane shall have a dedicated LCS. DMS will be installed on the nominated approaches and prior to main interchanges and intersections to advise of any issues ahead and to thereby assist the operators and motorists to re-route vehicles around any incidents.

The following list contains examples of ITS equipment that can be deployed on a gantry, (reducing the number of gantries is recommended to help reduce operation and maintenance complexity in the future):-

- DMS
- LCS
- License Plate Readers (LPR)
- Close Circuit Television (CCTV) (if agreed within the design review process)
- Vehicle Detection Equipment
- Other as agreed within the design review process

Due to spacing limitations it is expected to have static signs collocated on ITS gantries in key locations as agreed within the design review process, to only those locations where there is an approval to do so to deliver a final solution due to visual and spacing limitations. Any such approval shall be based on static sign approvals with Ashghal Signage department and joint reviews with ITS designers and contractors.

The following are some primary functional and non-functional requirements that need to be considered when including gantries as part of a wider design process:

1. Safety
 - a. Safety for the technicians and engineers;

- b. Improved safety and protection for the general public from (i.e. falling objects) and a reduction in accidents caused during temporary traffic management situations;
 - c. Reduction across the entire roadway network in the use of MEWPS (Mobile Elevated Work Platform)/Hiabs/Attenuator Vehicles, etc., because of use of the man accessible structures.
2. Maintainability
- a. Increased ease of access for maintenance activities;
 - b. Less time restraints for access to equipment given that the gantries will be man accessible, therefore leading to a more effective remediation of faults and or pro-active maintenance;
 - c. Minimal, if any requirement for additional Mobile Elevating Work Platform (MEWP)/Hiabs/attenuator vehicles, etc.;
 - d. Possibility of producing a more comprehensive proactive maintenance regimen, allowing more maintenance visits on a regular basis as no lane/road closures are required for this activity anymore (unless signs need replaced);
3. Network access and performance.
- a. Significant reduction on road closures and associated road space bookings, and temporary traffic management, more importantly less disruption to drivers;
 - b. Minimal, if any requirement for additional MEWP/Hiabs/attenuator vehicles, etc.
4. Constructability
- a. Dependent on the design approach agreed by Ashghal, these gantries can possibly accommodate the horizontal span in sections for ease of manufacturing and also potentially include a modular construction up to a maximum width of roadway. This will allow Ashghal to have a surplus stock of sections that just need to be bolted together after a gantry design has been prepared. Following this methodology will also allow the replacement of sections on a gantry that has at any point incurred an impact from an over height vehicle. The same principle can also be applied to the leg support uprights.
 - b. This type of gantry will allow the contractor to “fit out” the gantry off site, with the exception of ADS (Advanced Directional Sign) and top mounted SDMS (Small Dynamic Message Sign) & DMS. The advantage of this is that most of the equipment can be pretested prior to being transported to site. Once arriving on site the installation of the gantry and commissioning of ITS equipment would be significantly reduced. The ITS power and communication cabling and the equipment fit out would be complete on the gantry, therefore all that would be required is a final connection from the cable distribution boxes on the walkway to the GME (Ground Mounted Enclosure) and FP (Feeder Pillar).

Currently mono-tube non-man accessible gantries have been installed in Qatar for static signs and existing ITS systems. During maintenance it is required to partially/fully close off the road and this can be undertaken at off peak times and hence minimize disruption to traffic flow. Engineers and technicians must use MEWP/Hiabs/attenuator vehicles to access the equipment for maintenance. The gantries provide minimal safety considerations for engineers, technicians or general public.

It is not envisaged that non-man accessible gantries should be eliminated from being deployed in Qatar, but for the purpose of ITS deployment the man accessible gantries should be used where ever possible.

There are two main gantry categories man accessible and non-man accessible, the following is a comparison table between both types based on gantry design aspects stated earlier:

	Non-Man Accessible Gantry	Man Accessible Gantry
Safety	<ul style="list-style-type: none"> - Minimum safety provided for engineers, technicians and the general public; - Lane(s) closure is required. 	<ul style="list-style-type: none"> - Safer for engineers, technicians and the general public; - No lane(s) closure is required.
Maintainability	<ul style="list-style-type: none"> - Lane(s) closure required; - Additional MEWP/Hiabs/attenuator vehicles required. 	<ul style="list-style-type: none"> - Easier to access equipment; - No lane(s) closure required; - Reduce cost and time for regular Maintenance.
Network access and Performance	<ul style="list-style-type: none"> - Lane(s) closure required; - Additional MEWP/Hiabs/attenuator vehicles required. 	<ul style="list-style-type: none"> - Minimum lane(s) closure required.
Constructability	<ul style="list-style-type: none"> - Testing is possible only after full gantry installation. 	<ul style="list-style-type: none"> - Allow for fitting equipment and test connections off-site

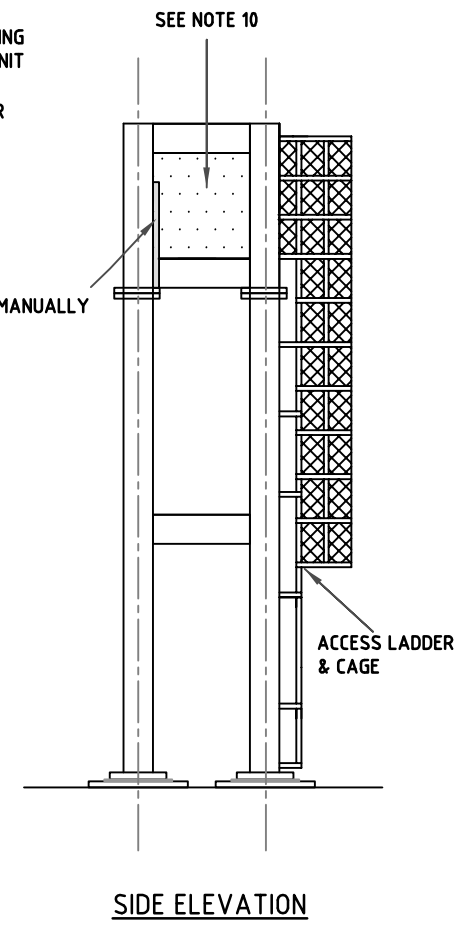
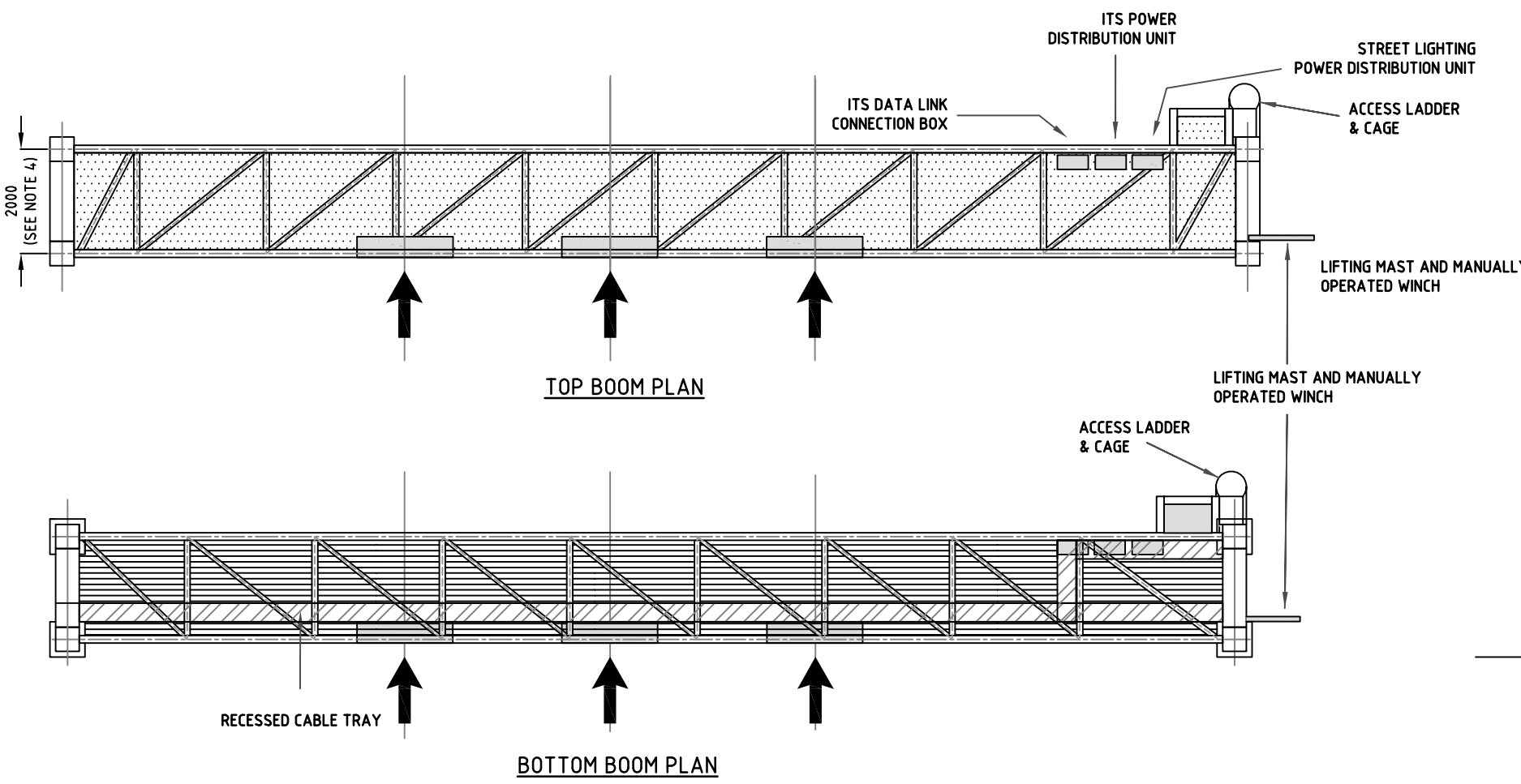
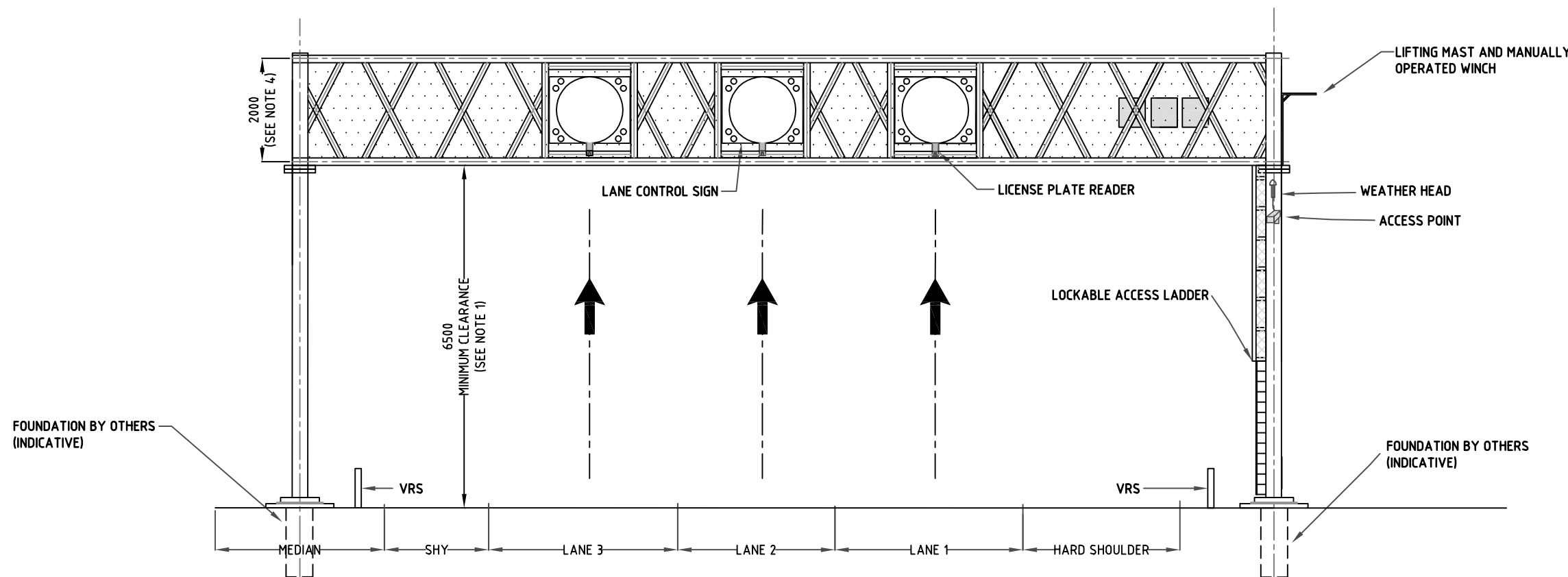
3 RECOMMENDATIONS

For the purpose of mounting safety supported electronic ITS equipment above the roadway, you are advised to follow the proposed man-accessible gantry structures as indicated in Appendix A.

4 APPENDIX A

CONCEPT GANTRY LAYOUTS

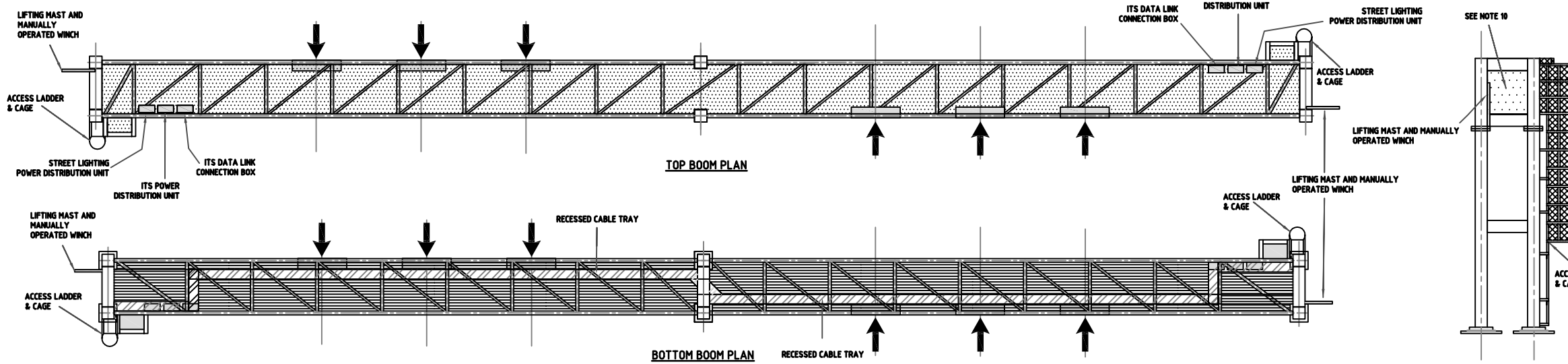
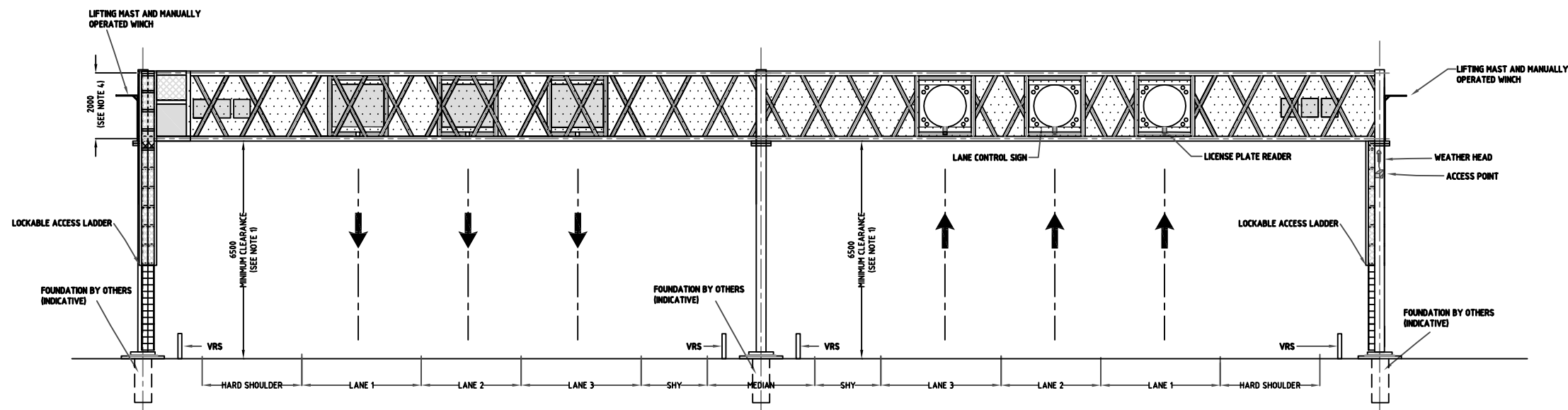
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01 of 10	MIDSPAN GANTRY LAYOUT - TYPE A	1.0
02 of 10	SUPERSPAN GANTRY LAYOUT - TYPE A	1.0
03 of 10	MIDSPAN GANTRY LAYOUT - TYPE B	1.0
04 of 10	SUPERSPAN GANTRY LAYOUT - TYPE B	1.0
05 of 10	MIDSPAN GANTRY LAYOUT - TYPE C	1.0
06 of 10	SUPERSPAN GANTRY LAYOUT - TYPE C	1.0
07 of 10	MIDSPAN GANTRY LAYOUT - TYPE D	1.0
08 of 10	SUPERSPAN GANTRY LAYOUT - TYPE D	1.0
09 of 10	MIDSPAN GANTRY LAYOUT - TYPE E	1.0
10 of 10	SUPERSPAN GANTRY LAYOUT - TYPE E	1.0



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LEGEND
VRS - VEHICLE RESTRAINT SYSTEM

1/A	OCT 2015	ISSUED FOR APPROVAL	JSG	GS	PR
Rev:	Date	Revision Details	Drawn	Chkd.	Appd.
هيئة الأشغال العامة Public Works Authority					
P.O. Box: 22188 Tel.: 00974 44950000 Fax: 00974 44950999					
IA INFRASTRUCTURE AFFAIRS					
Project Management Consultant :					
Design Consultant :					
GANNETT FLEMING WLL					
Project Name:					
INTELLIGENT TRANSPORTATION SYSTEM					
ITS DEVICE DETAILS					
Project Code:					
Status:					
DRAFT SPECIMEN					
Drawing Title:					
CONCEPT GANTRY LAYOUTS					
NOT TO BE USED FOR CONSTRUCTION					
MIDSPAN GANTRY LAYOUT - TYPE A					
Drawn:	JSG		Checked:	GRS	
Designed:	N/A		Approved:	PR	
Date:	OCTOBER 2015		Scale:	NTS	
Drawing Number:	01 OF 10				Revision:
					1.0



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INFRASTRUCTURE AFFAIRS

Project Management Consultant:

Design Consultant:
GANNETT FLEMING WLL

Project Name:
INTELLIGENT TRANSPORTATION SYSTEM

ITS DEVICE DETAILS

Project Code:

Status:
DRAFT SPECIMEN

Drawing Title:
CONCEPT GANTRY LAYOUTS

NOT TO BE USED FOR CONSTRUCTION

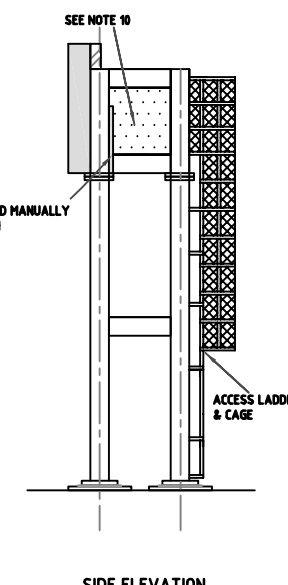
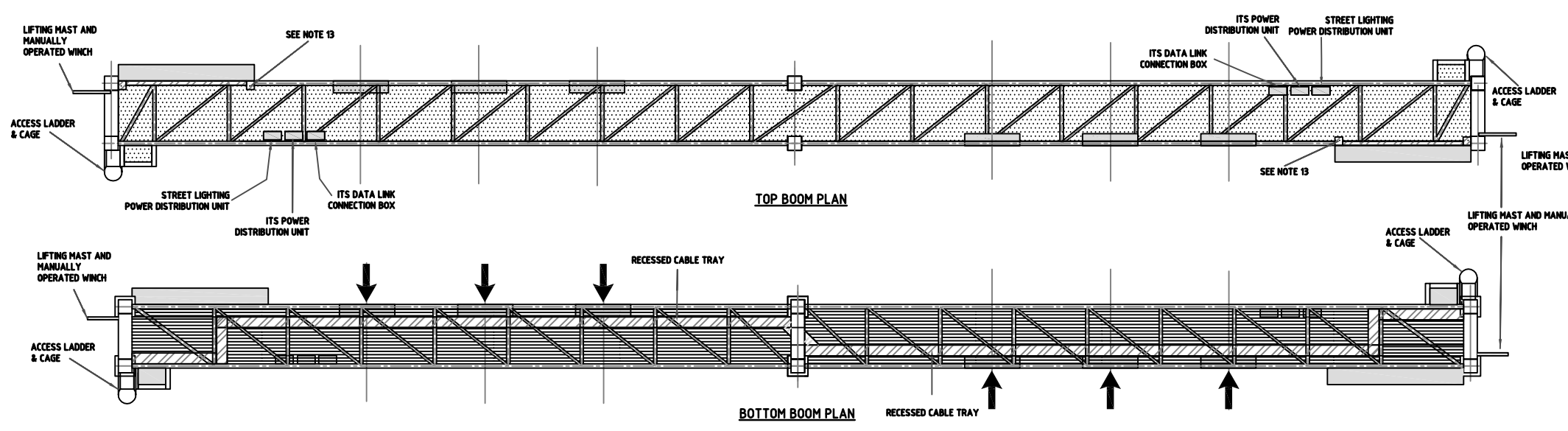
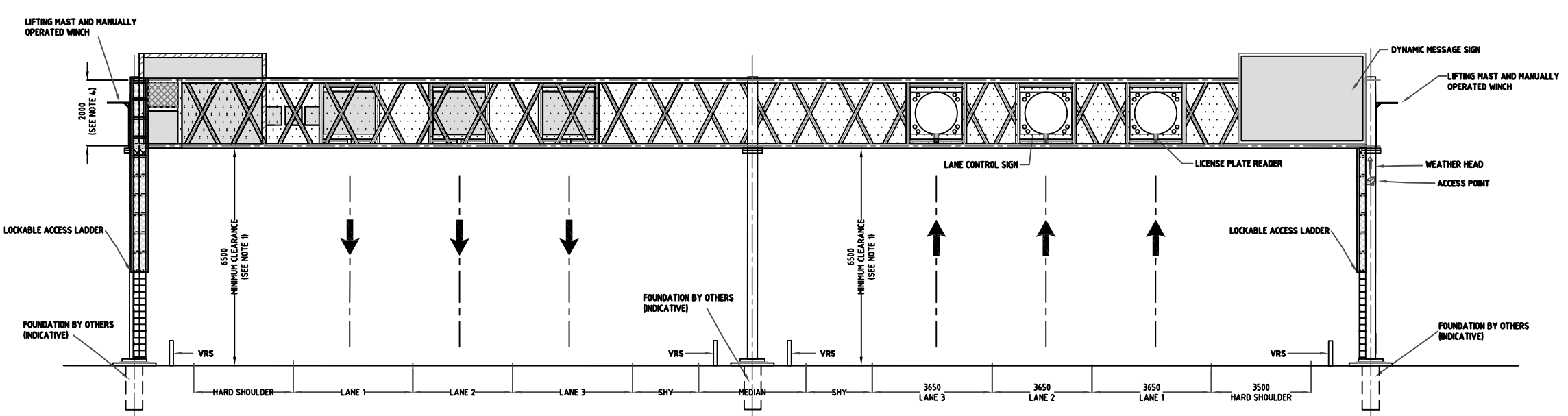
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Drawn: **JSG** Checked: **GRS**

Designed: **N/A** Approved: **PR**

Date: **OCTOBER 2015** Scale: **NTS**

Drawing Number: **02 OF 10** Revision: **1.0**



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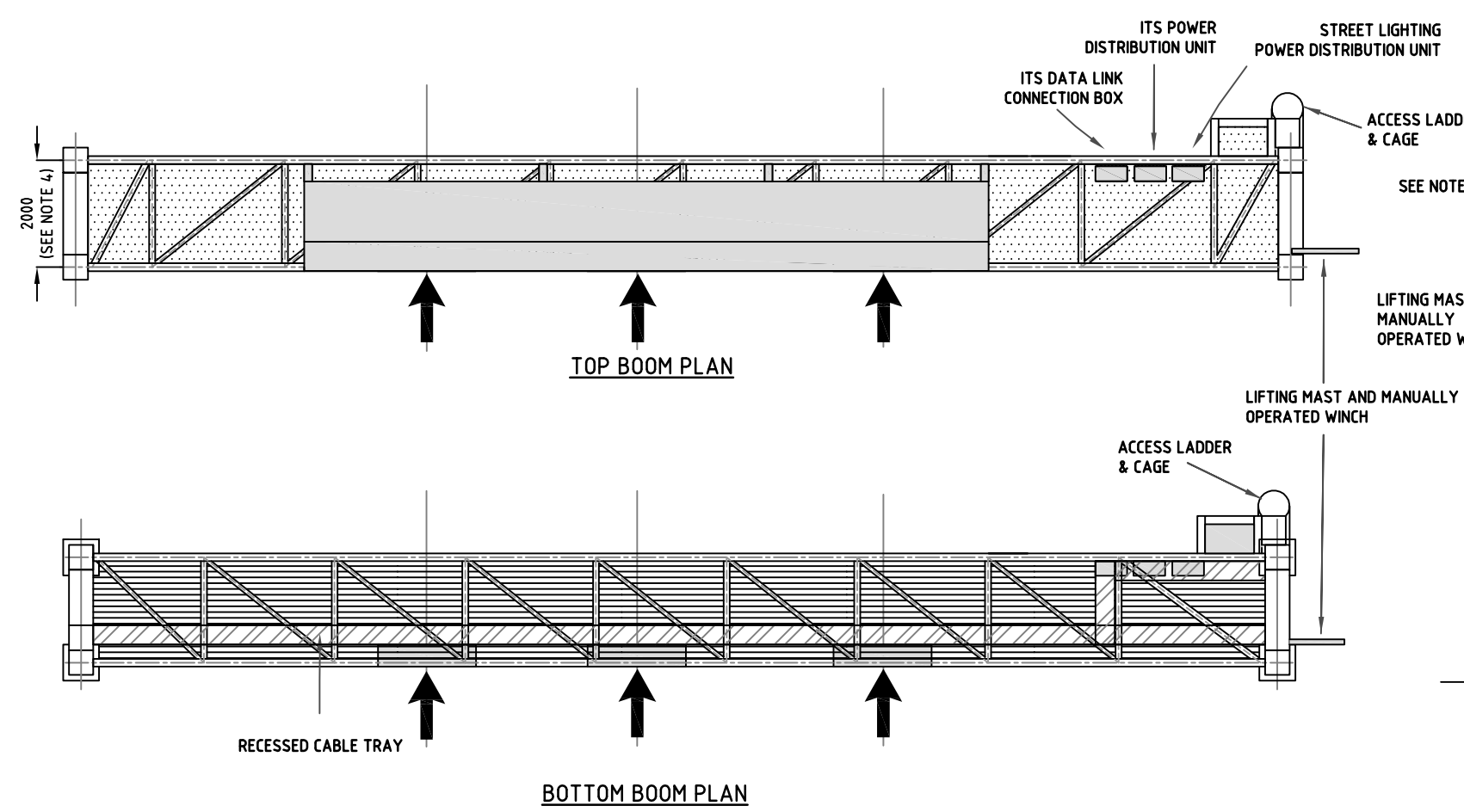
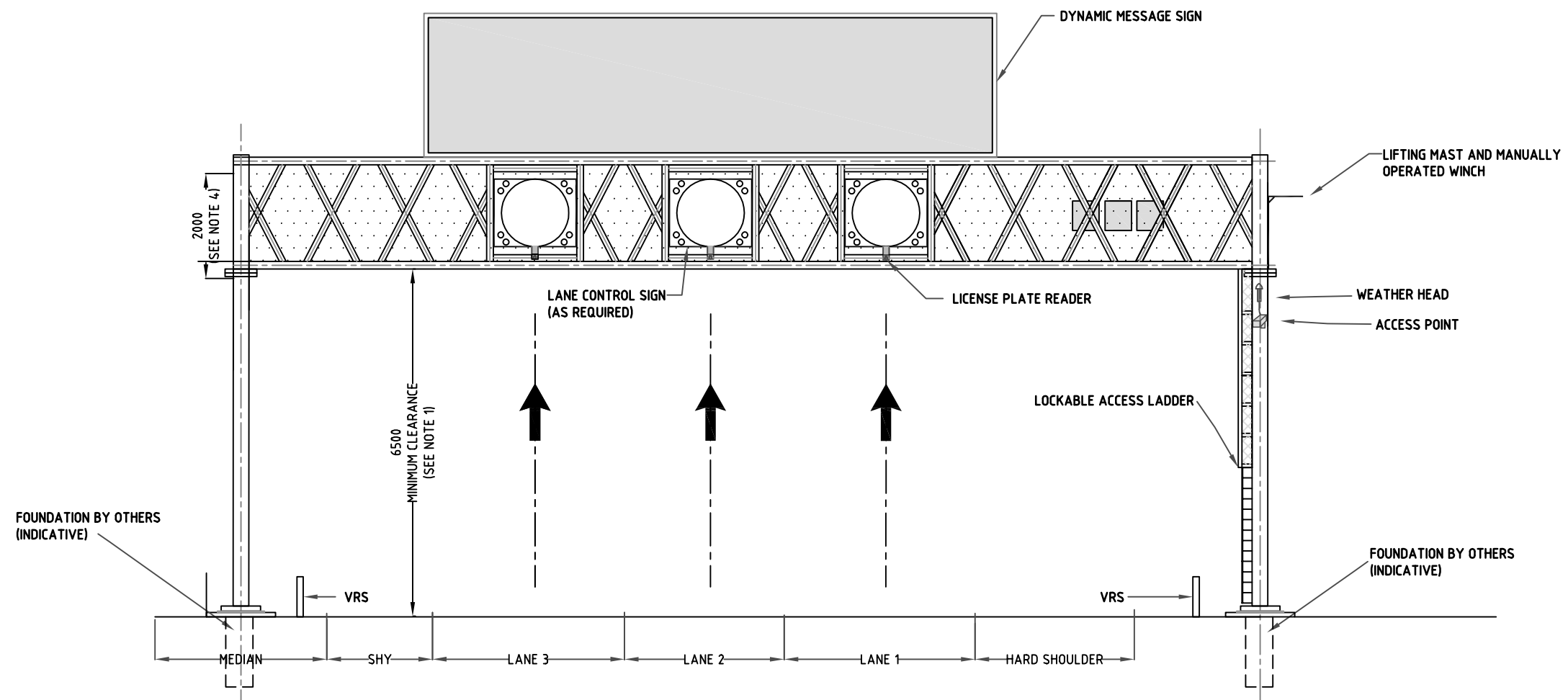
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Drawing Title:
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NOT TO BE USED FOR CONSTRUCTION
SUPERSPAN GANTRY LAYOUT - TYPE B**

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Designed: **N/A** Approved: **PR**

Date: **OCTOBER 2015** Scale: **NTS**

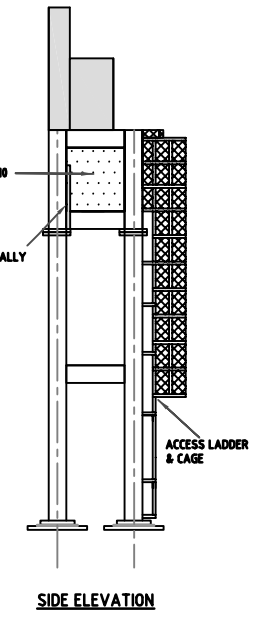
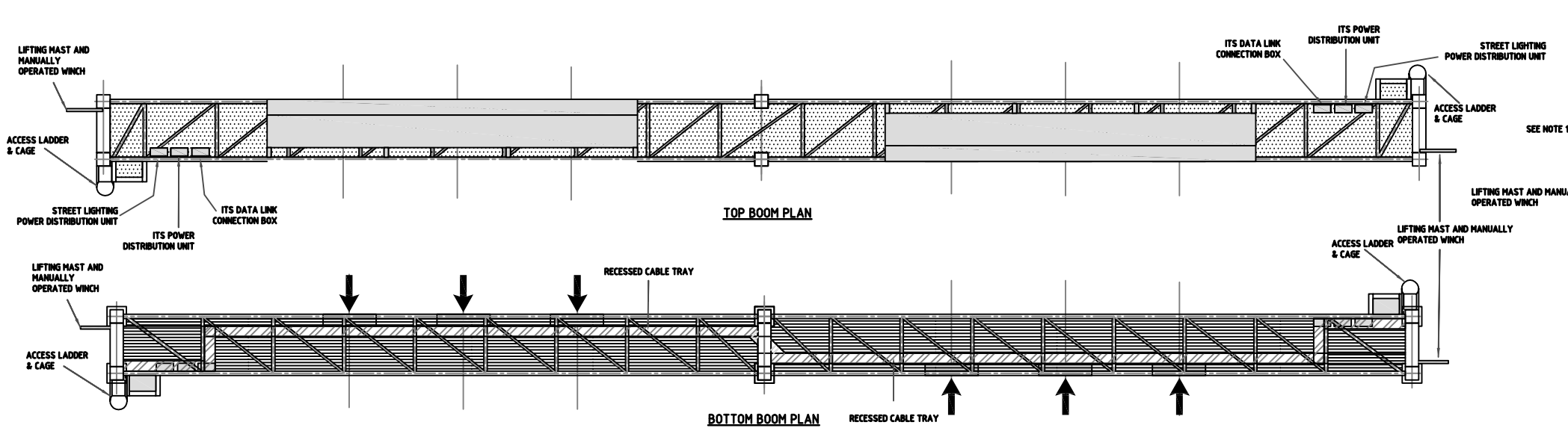
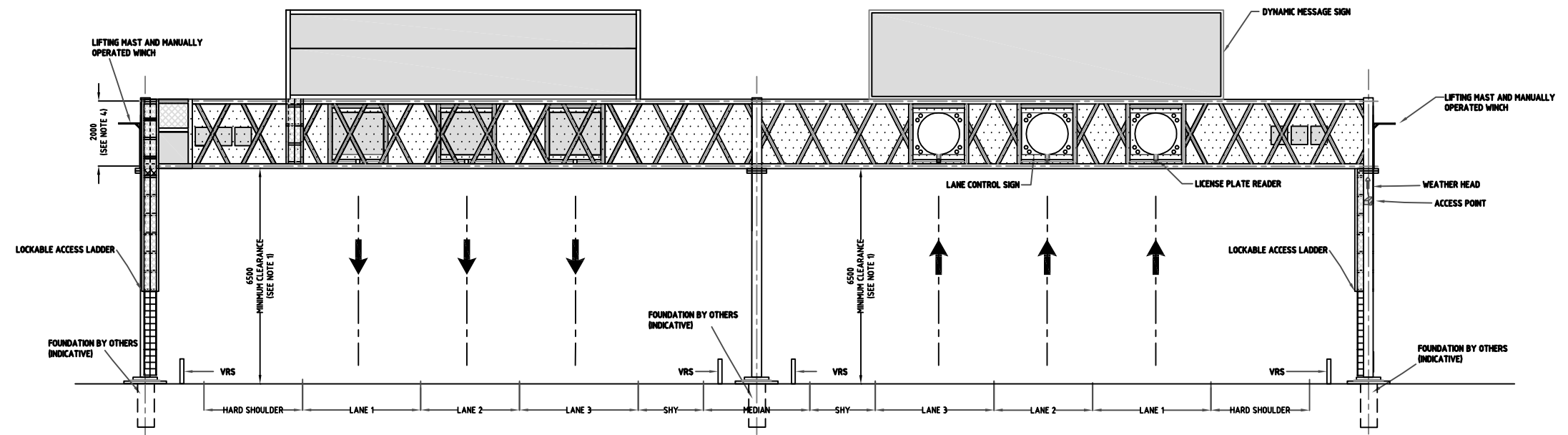
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LEGEND
VRS - VEHICLE RESTRAINT SYSTEM

1/0	OCT 2015	ISSUED FOR APPROVAL	JSG	GS	PR
Rev:	Date	Revision Details	Drawn	Chkd.	Appd.
هيئة الأشغال العامة Public Works Authority					
P.O. Box: 22188 Tel.: 00974 44950000 Fax: 00974 44950999					
IA INFRASTRUCTURE AFFAIRS					
Project Management Consultant:					
Design Consultant:					
GANNETT FLEMING WLL					
Project Name:					
INTELLIGENT TRANSPORTATION SYSTEM ITS DEVICE DETAILS					
Project Code:					
Status:					
DRAFT SPECIMEN					
Drawing Title:					
CONCEPT GANTRY LAYOUTS NOT TO BE USED FOR CONSTRUCTION MIDSPAN GANTRY LAYOUT - TYPE C					
Drawn:	JSG		Checked:	GRS	
Designed:	N/A		Approved:	PR	
Date:	OCTOBER 2015		Scale:	NTS	
Drawing Number:	05 OF 10				Revision:
					1.0



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 2. ALL LEVELS ARE IN METERS AND RELATED TO SITE DATUM UNLESS NOTED OTHERWISE.
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LEGEND
VRS - VEHICLE RESTRAINT SYSTEM

1/A	OCT 2015	ISSUED FOR APPROVAL	JSG	GS	PR
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Revision Details: **هيئة الأشغال العامة**
 Public Works Authority
 P.O. Box: 22188
 Tel.: 00974 44950000
 Fax: 00974 44950999
IA INFRASTRUCTURE AFFAIRS
 Project Management Consultant:

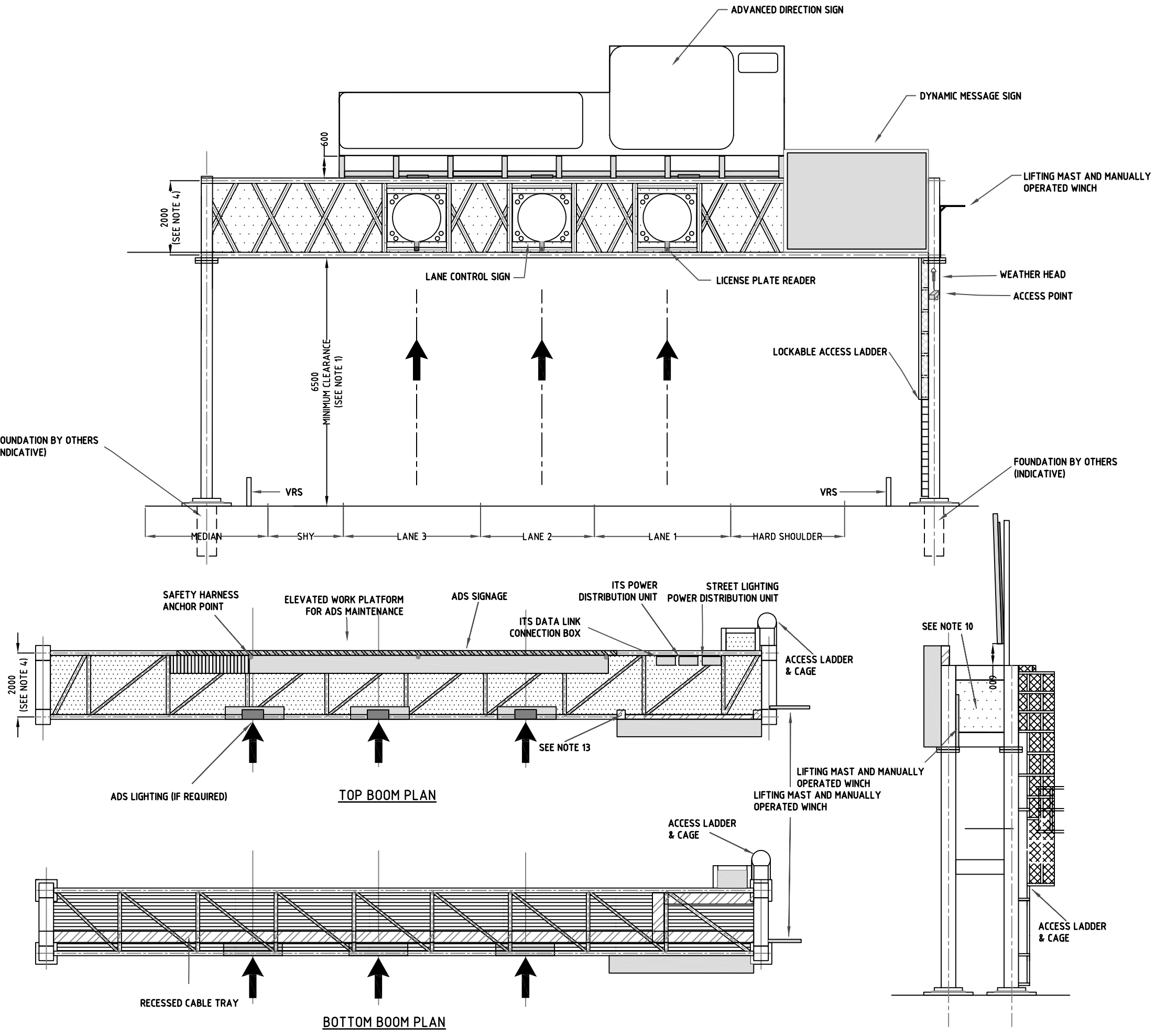
Design Consultant:
GANNETT FLEMING WLL

Project Name:
**INTELLIGENT TRANSPORTATION SYSTEM
ITS DEVICE DETAILS**

Project Code:
DRAFT SPECIMEN

Drawing Title:
**CONCEPT GANTRY LAYOUTS
NOT TO BE USED FOR CONSTRUCTION
SUPERSPAN GANTRY LAYOUT - TYPE C**

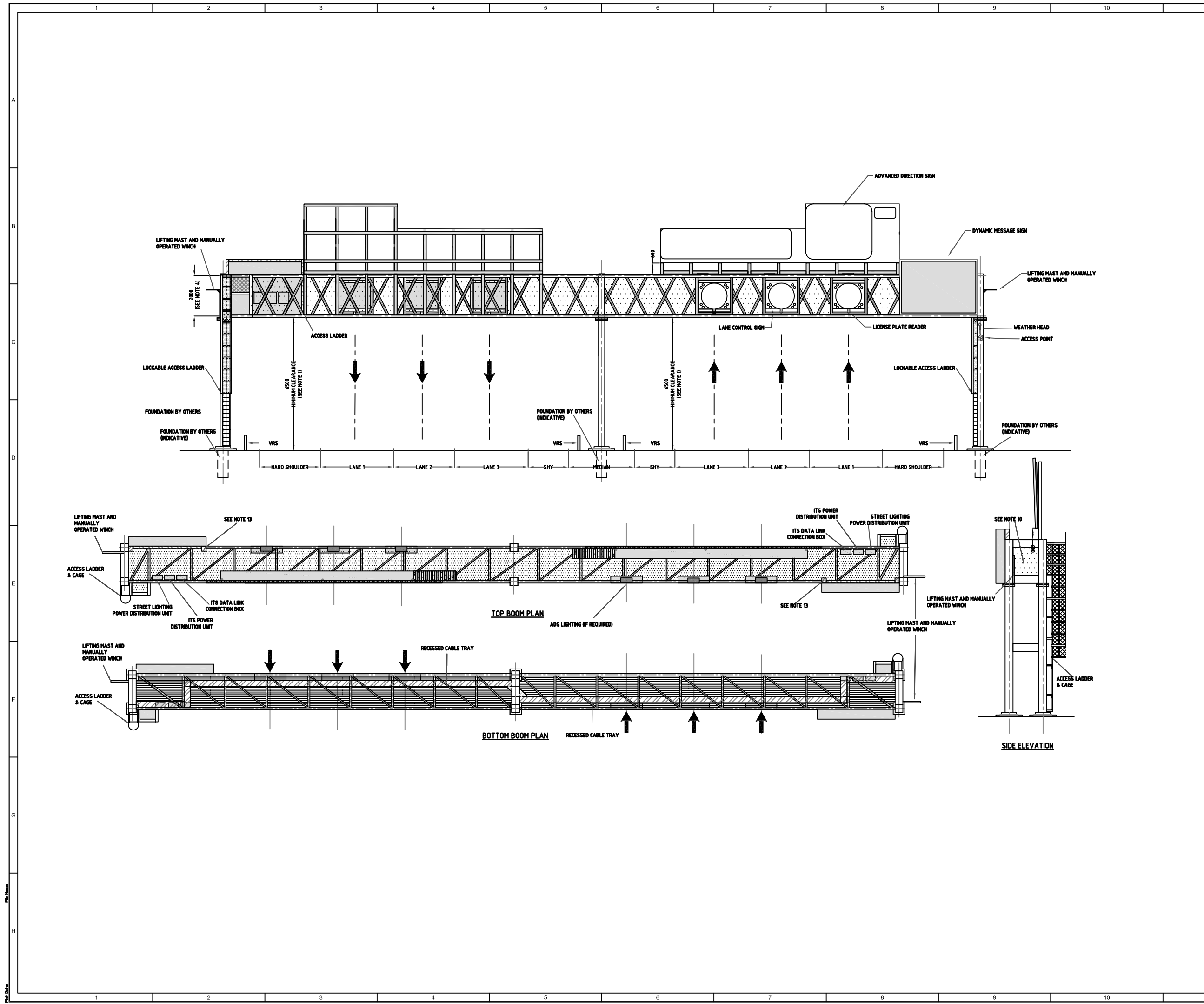
Drawn:	JSG	Checked:	GRS
Designed:	N/A	Approved:	PR
Date:	OCTOBER 2015	Scale:	NTS
Drawing Number:	06 OF 10		Revision: 1.0



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LEGEND
VRS - VEHICLE RESTRAINT SYSTEM

1/A	OCT 2015	ISSUED FOR APPROVAL	JSG	GS	PR
Rev.	Date	Revision Details	Drawn	Chkd.	Appd.
هيئة الأشغال العامة Public Works Authority					
P.O. Box: 22188 Tel.: 00974 44950000 Fax: 00974 44950999					
INFRASTRUCTURE AFFAIRS			Project Management Consultant:		
Design Consultant:			GANNETT FLEMING WLL		
Project Name:			INTELLIGENT TRANSPORTATION SYSTEM ITS DEVICE DETAILS		
Project Code:			DRAFT SPECIMEN		
Drawing Title:			CONCEPT GANTRY LAYOUTS NOT TO BE USED FOR CONSTRUCTION MIDSPAN GANTRY LAYOUT - TYPE D		
Drawn:	JSG	Checked:	GRS		
Designed:	N/A	Approved:	PR		
Date:	OCTOBER 2015	Scale:	NTS		
Drawing Number:	07 OF 10			Revision:	1.0



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LEGEND

VRS - VEHICLE RESTRAINT SYSTEM

1A	OCT 2015	ISSUED FOR APPROVAL	JSG	GS	PR
Rev:	Date	Revision Details	Drawn	Chkd.	Appd.

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Public Works Authority

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Project Management Consultant :

Design Consultant :
GANNETT FLEMING WLL

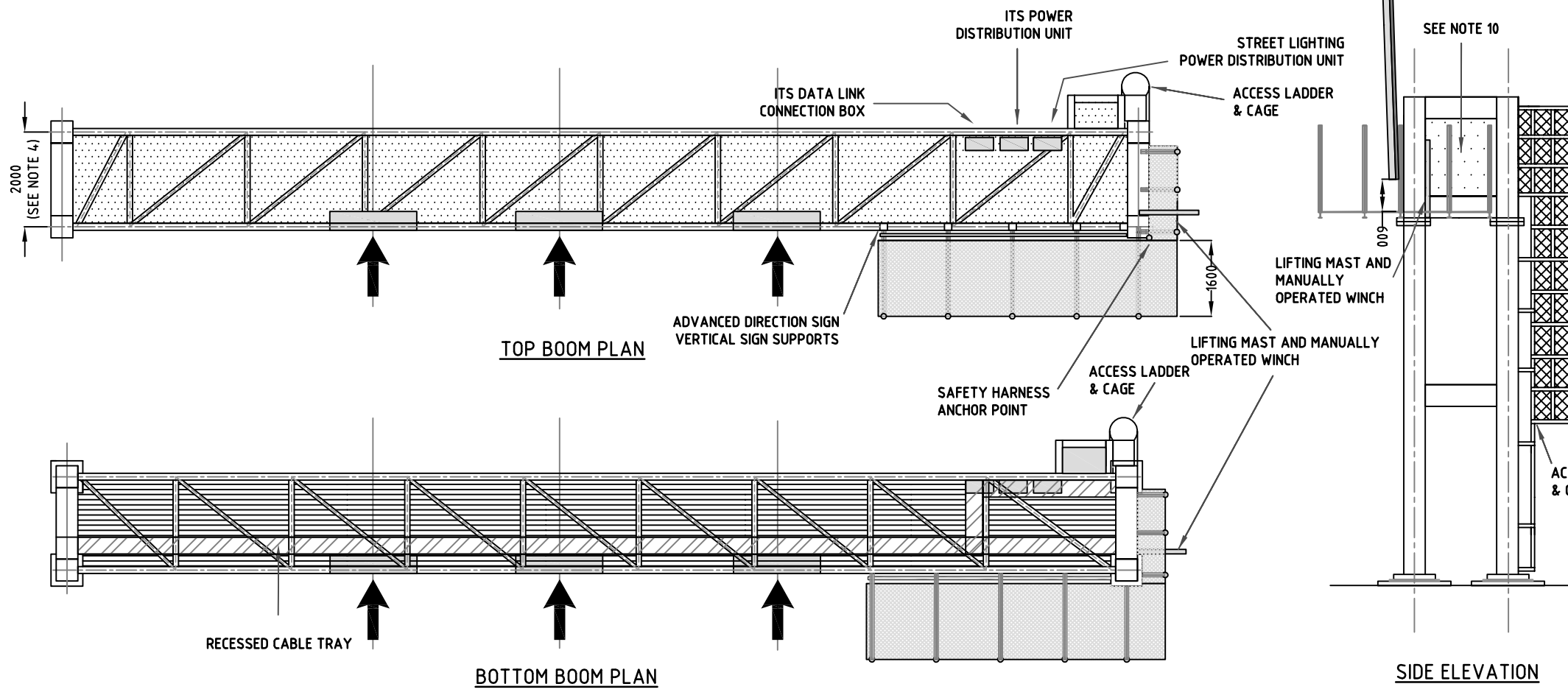
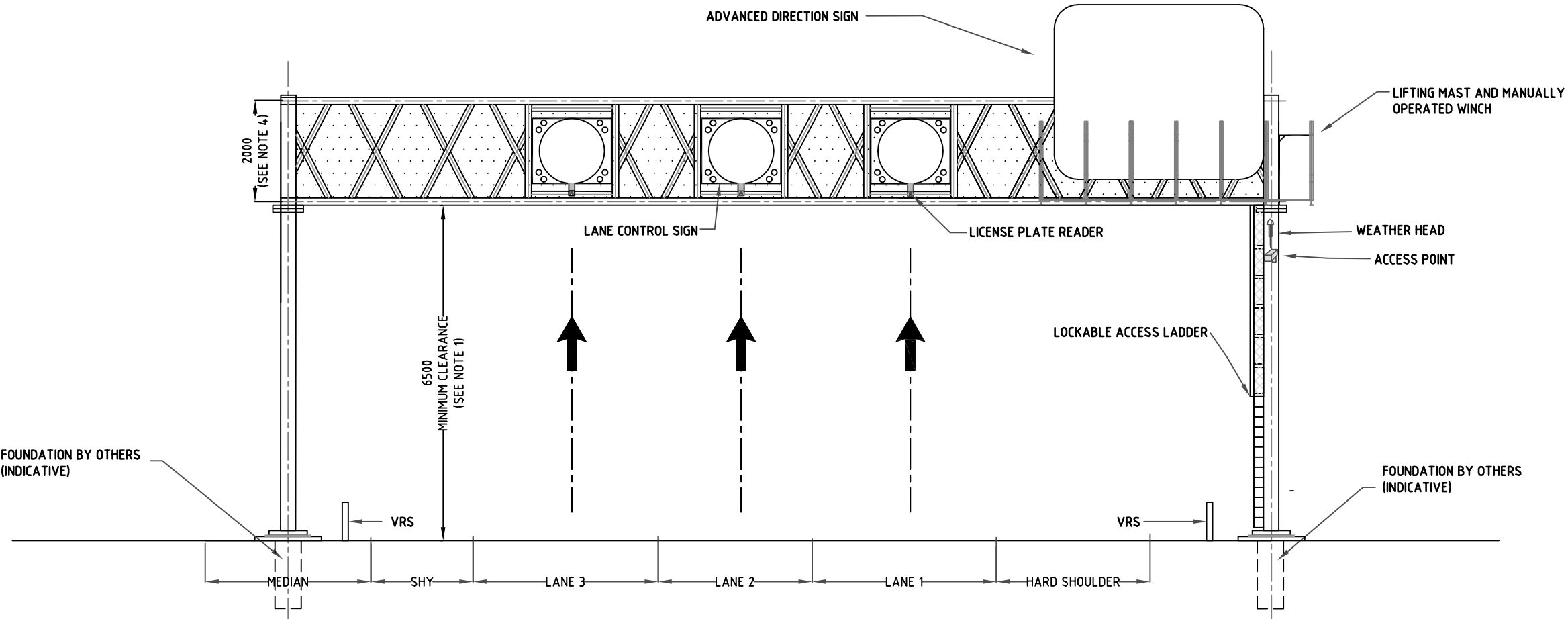
Project Name:
**INTELLIGENT TRANSPORTATION SYSTEM
ITS DEVICE DETAILS**

Project Code:

Status: **DRAFT SPECIMEN**

Drawing Title:
**CONCEPT GANTRY LAYOUTS
NOT TO BE USED FOR CONSTRUCTION
SUPERSPAN GANTRY LAYOUT - TYPE D**

Drawn:	JSG	Checked:	GRS
Designed:	N/A	Approved:	PR
Date:	OCTOBER 2015	Scale:	NTS
Drawing Number:	08 OF 10		Revision: 1.0



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LEGEND
VRS - VEHICLE RESTRAINT SYSTEM

1/A	OCT 2015	ISSUED FOR APPROVAL	JSG	GS	PR
Rev.	Date	Revision Details	Drawn	Chkd.	Appd.
هيئة الأشغال العامة Public Works Authority					
P.O. Box: 22188 Tel.: 00974 44950000 Fax: 00974 44950999					
 IA INFRASTRUCTURE AFFAIRS قطر تستحق الأفضل Qatar Deserves The Best www.ashghal.gov.qa					

Project Management Consultant:

Design Consultant:
GANNETT FLEMING WLL

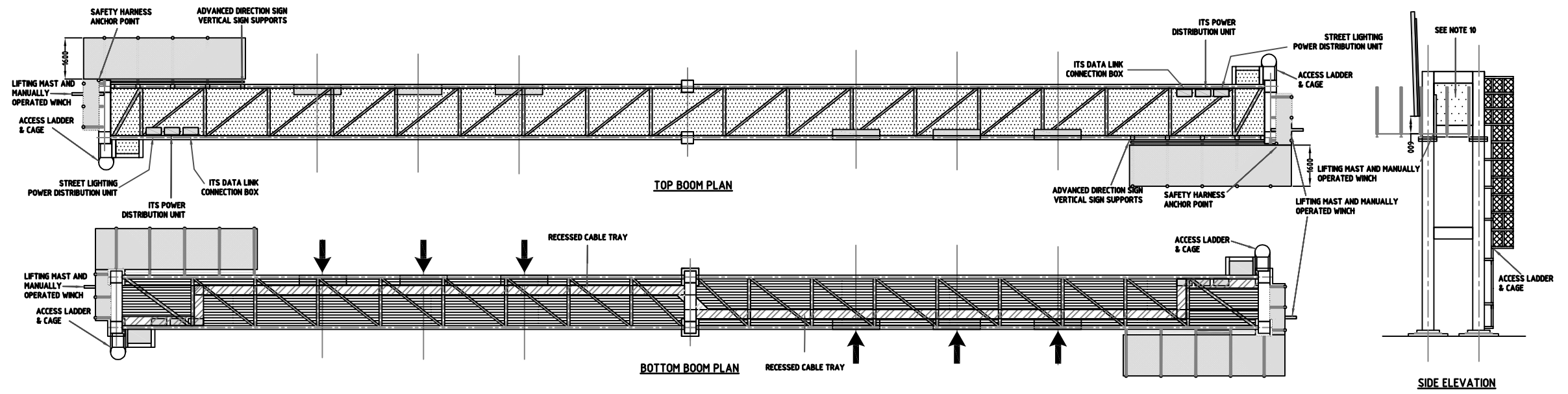
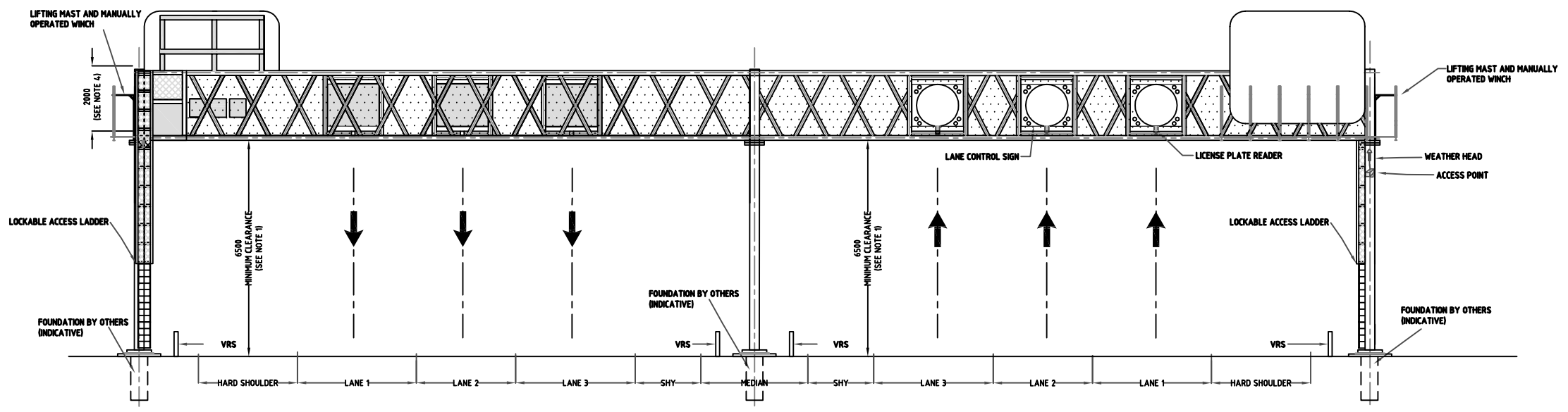
Project Name:
**INTELLIGENT TRANSPORTATION SYSTEM
ITS DEVICE DETAILS**

Project Code:

Status:
DRAFT SPECIMEN

Drawing Title:
**CONCEPT GANTRY LAYOUTS
NOT TO BE USED FOR CONSTRUCTION
MIDSPAN GANTRY LAYOUT - TYPE E**

Drawn:	JSG	Checked:	GRS
Designed:	N/A	Approved:	PR
Date:	OCTOBER 2015	Scale:	NTS
Drawing Number:	09 OF 10		Revision: 1.0



- NOTES:**
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LEGEND
VRS - VEHICLE RESTRAINT SYSTEM

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INFRASTRUCTURE AFFAIRS

Project Management Consultant :

Design Consultant :

GANNETT FLEMING WLL

Project Name:
INTELLIGENT TRANSPORTATION SYSTEM

ITS DEVICE DETAILS

Project Code:

Status:
DRAFT SPECIMEN

Drawing Title:
CONCEPT GANTRY LAYOUTS

NOT TO BE USED FOR CONSTRUCTION

SUPERSPAN GANTRY LAYOUT - TYPE E

Drawn: **JSG** Checked: **GRS**

Designed: **N/A** Approved: **PR**

Date: **OCTOBER 2015** Scale: **NTS**

Drawing Number:
10 OF 10 Revision:
1.0