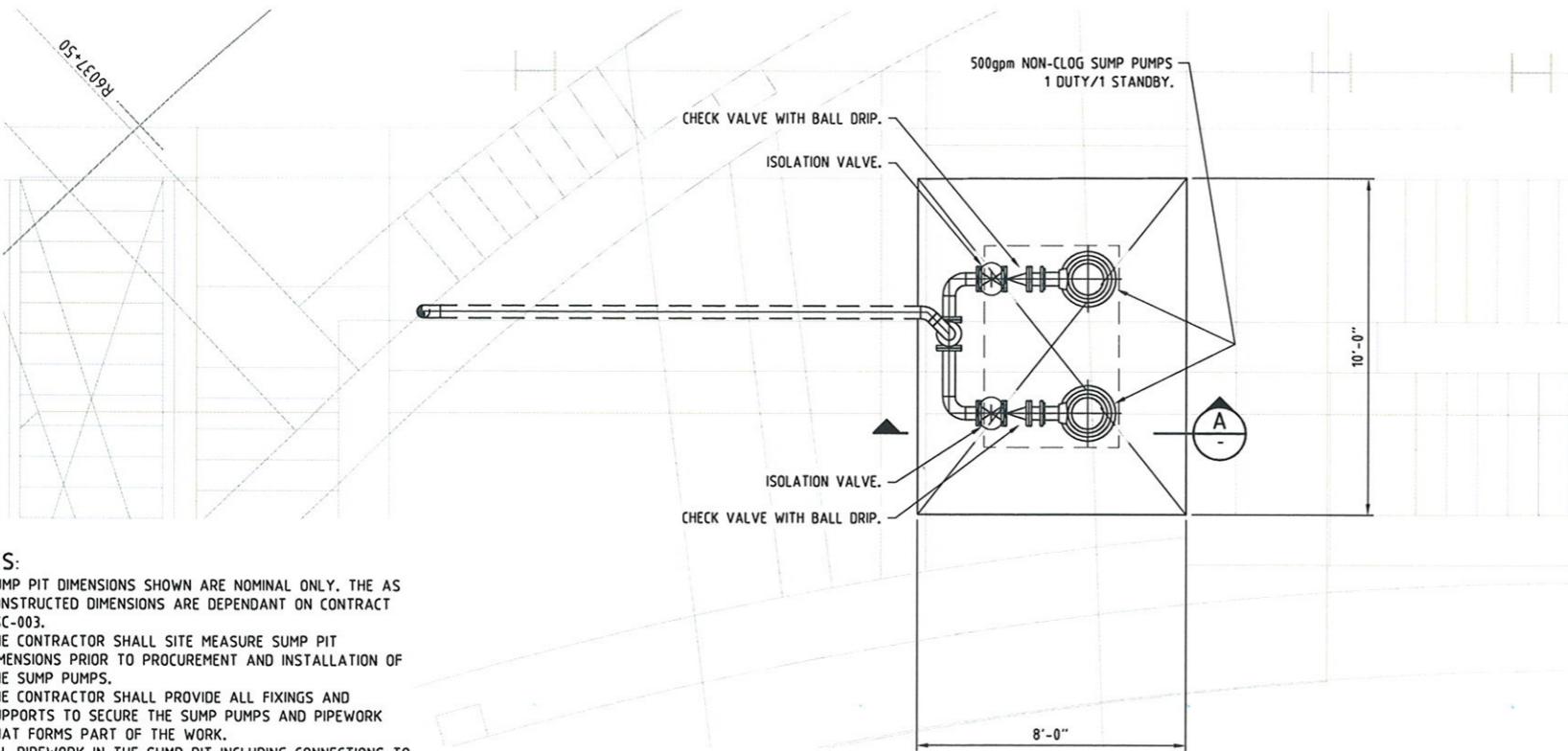


**LOCATION PLAN**

SCALE 1/16" - 1'-0"



**SUMP PLAN**

SCALE 3/8" - 1'-0"

**NOTES:**

1. SUMP PIT DIMENSIONS SHOWN ARE NOMINAL ONLY. THE AS CONSTRUCTED DIMENSIONS ARE DEPENDANT ON CONTRACT NSC-003.
2. THE CONTRACTOR SHALL SITE MEASURE SUMP PIT DIMENSIONS PRIOR TO PROCUREMENT AND INSTALLATION OF THE SUMP PUMPS.
3. THE CONTRACTOR SHALL PROVIDE ALL FIXINGS AND SUPPORTS TO SECURE THE SUMP PUMPS AND PIPEWORK THAT FORMS PART OF THE WORK.
4. ALL PIPEWORK IN THE SUMP PIT INCLUDING CONNECTIONS TO THE OUTLET FLANGES IS PART OF CONTRACT NSC-009, EXCEPT WHERE SPECIFICALLY DESIGNATED ON DRAWINGS.
5. INLET PIPEWORK AND DISCHARGE PIPEWORK TO THE SEWER IS NOT PART OF CONTRACT NSC-009, EXCEPT WHERE SPECIFICALLY DESIGNATED ON DRAWINGS.
6. FOR STRUCTURAL DETAILS REFER TO DRAWINGS 03TN317, 03TN318, 03TN338, 03TN339 AND 03TN378.
7. THE CONTRACTOR SHALL REFER TO SECTION 15445 "TUNNEL MECHANICAL DRAINAGE SYSTEMS" OF THE CONTRACT DOCUMENTS FOR FURTHER DETAILS.

NO.	DATE	DESCRIPTION
	JUNE 27, 2008	REVISIONS

**MAUNSELL | AECOM**

Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

*C. Stacy*  
APPROVED

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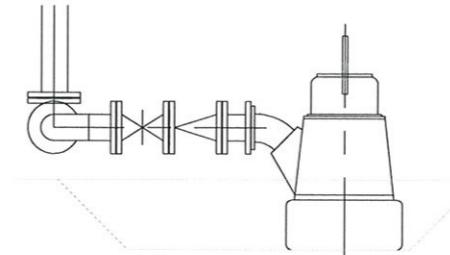
REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND  
**CONRAD H. STACY**  
RPEQ 5128  
SIGNATURE  
PATP #002104

**DMJM HARRIS | AECOM**  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

APPROVED DATE

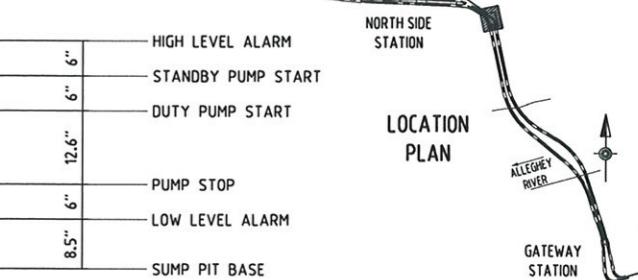
DESIGNED AP  
DRAWN K  
CHECKED PG  
IN CHARGE CS  
DATE 06/27/08  
SCALE AS NOTED

**PORT AUTHORITY OF ALLEGHENY COUNTY**  
PITTSBURGH PENNSYLVANIA  
NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
GATEWAY LINE  
TUNNEL SUMP PUMP PLAN & PIPING ROUTE  
**Port Authority** CONTRACT NO. NSC-009  
DWG. NO. MC-101 SHT. 618



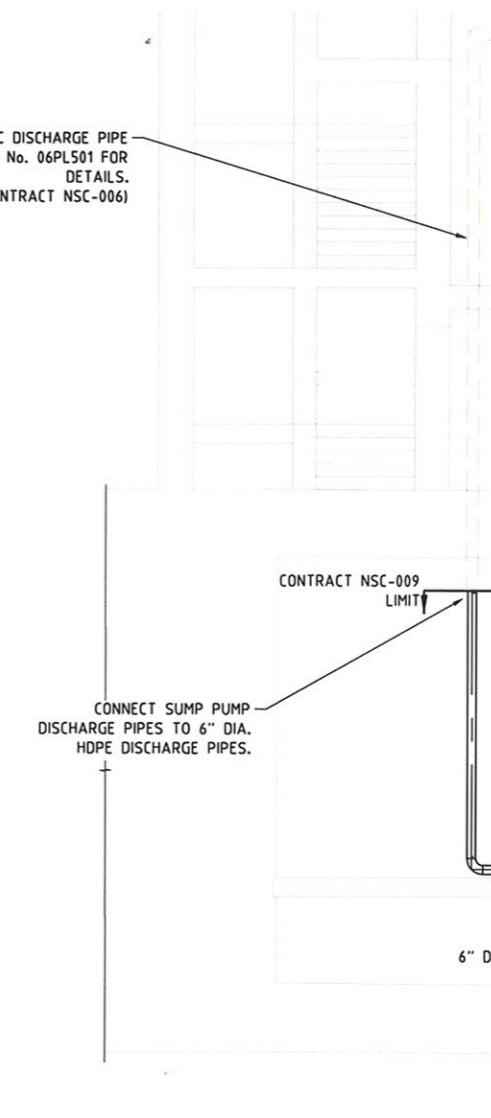
**SUMP PUMP LEVEL DETECTION**

BASED ON FLYGT MODEL 2151.181  
SCALE 3/4" - 1'-0"

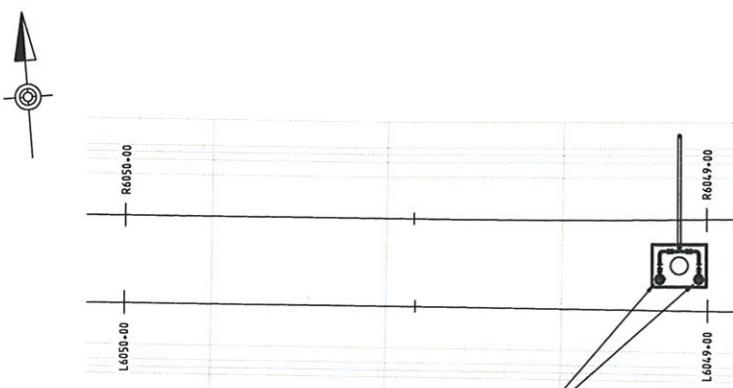


**LOCATION PLAN**  
NOTE:  
SUMP LEVEL DIMENSIONS ARE NOMINAL ONLY AND MAY CHANGE DEPENDANT ON PUMP SELECTION AND FINAL PIT DIMENSIONS. CONTRACTOR SHALL CONFIRM THE SUMP LEVEL DIMENSIONS.

3" DIA. PVC DISCHARGE PIPE  
REFER DRG. No. 06PL501 FOR DETAILS.  
(BY CONTRACT NSC-006)

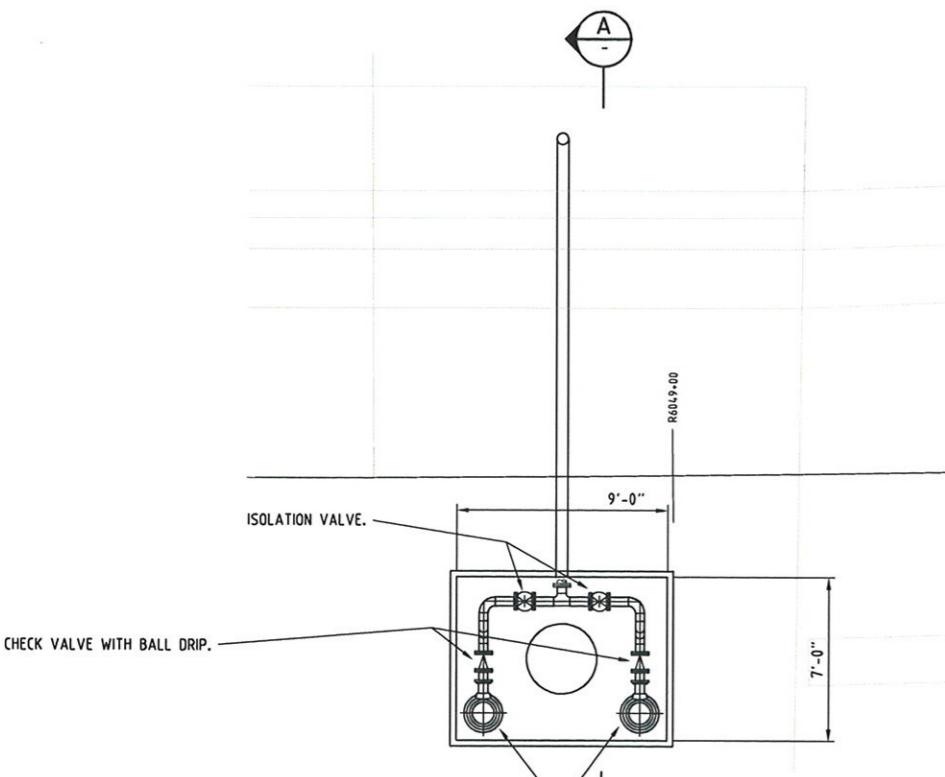
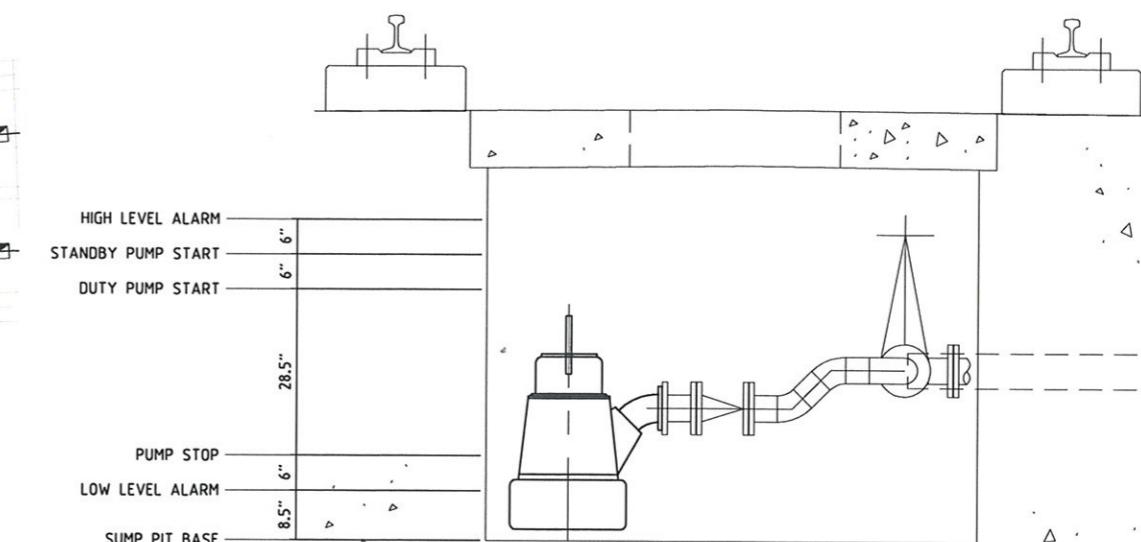


**SECTION A**  
SCALE 1/4"-1"



**LOCATION PLAN**

SCALE 1/16" - 1'-0"

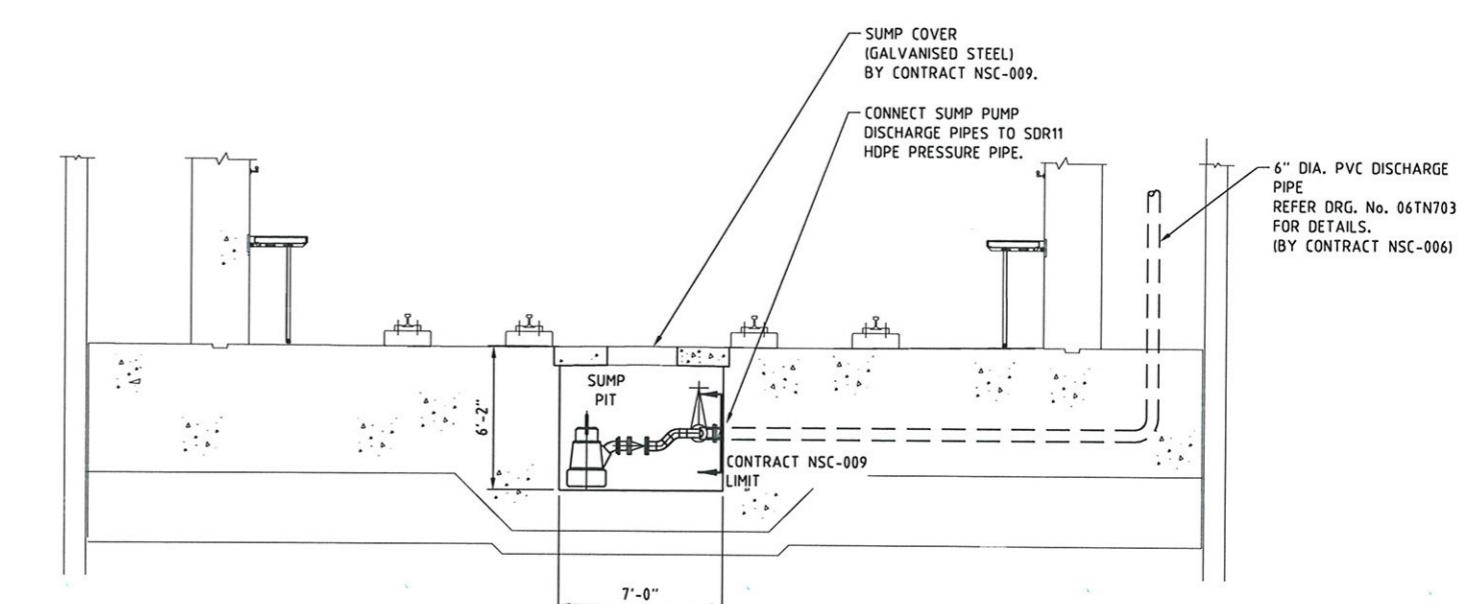


**SUMP PLAN**

SCALE 1/4" - 1'-0"

**NOTES:**

1. SUMP PIT DIMENSIONS SHOWN ARE NOMINAL ONLY. THE AS CONSTRUCTED DIMENSIONS ARE DEPENDANT ON CONTRACT NSC-006.
2. THE CONTRACTOR SHALL SITE MEASURE SUMP PIT DIMENSIONS PRIOR TO PROCUREMENT AND INSTALLATION OF THE SUMP PUMPS.
3. THE CONTRACTOR SHALL PROVIDE ALL FIXINGS AND SUPPORTS TO SECURE THE SUMP PUMPS AND PIPEWORK THAT FORMS PART OF THE WORK.
4. ALL PIPEWORK IN THE SUMP PIT INCLUDING CONNECTIONS TO THE OUTLET FLANGES IS PART OF CONTRACT NSC-009, EXCEPT WHERE SPECIFICALLY DESIGNATED ON DRAWINGS.
5. INLET PIPEWORK AND DISCHARGE PIPEWORK TO THE SEWER IS NOT PART OF CONTRACT NSC-009, EXCEPT WHERE SPECIFICALLY DESIGNATED ON DRAWINGS.
6. FOR STRUCTURAL DETAILS REFER TO DRAWINGS 06TN615, 06TN636 AND 06TN703 AND 03TN378.
7. THE CONTRACTOR SHALL REFER TO SECTION 15445 "TUNNEL MECHANICAL DRAINAGE SYSTEMS" OF THE CONTRACT DOCUMENTS FOR FURTHER DETAILS.



**SUMP PUMP LEVEL DETECTION**

BASED ON FLYGT MODEL 2151.181  
SCALE 3/4" - 1'-0"

**SECTION A**  
SCALE 1/4"-1'

**MAUNSELL | AECOM**

Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

*C Stacey*  
APPROVED  
JUNE 27, 2008  
DATE

NO.	DATE	DESCRIPTION
REVISIONS		

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REGISTERED  
PROFESSIONAL  
ENGINEER OF  
QUEENSLAND  
**CONRAD K.B. STACEY**  
RPEQ 5128  
*C Stacey*  
SIGNATURE  
PATP #002194

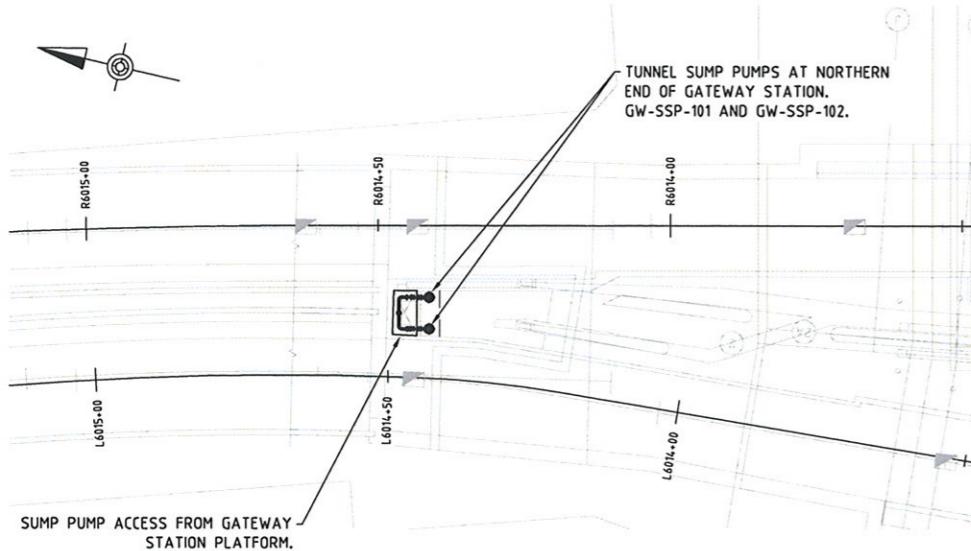
**DMJM HARRIS | AECOM**  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

APPROVED \_\_\_\_\_ DATE \_\_\_\_\_

**PORT AUTHORITY OF ALLEGHENY COUNTY**  
PITTSBURGH PENNSYLVANIA

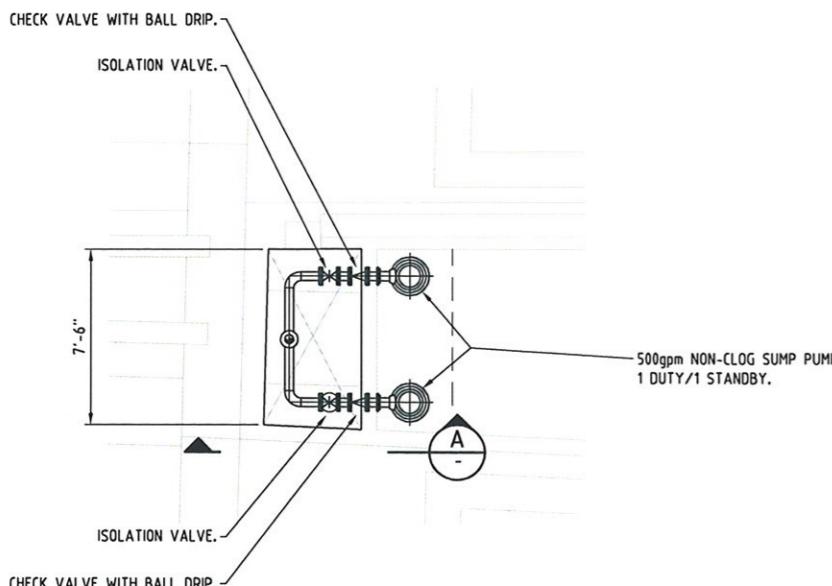
NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
GATEWAY LINE  
NORTH SIDE STATION TO PORTAL SUMP PUMP - PLAN

<b>Port Authority</b>	CONTRACT NO. NSC-009
DWG. NO. MC-102	SHT. 619



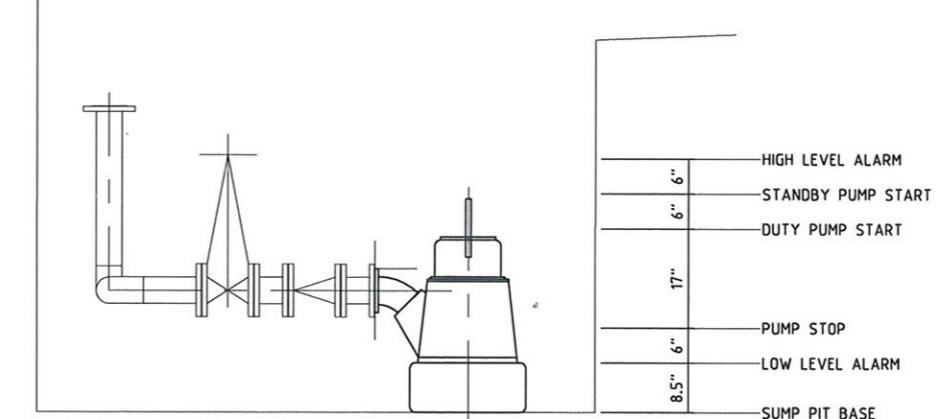
**LOCATION PLAN**

SCALE 1/16" - 1'-0"



**SUMP PLAN**

SCALE 1/4" - 1'-0"



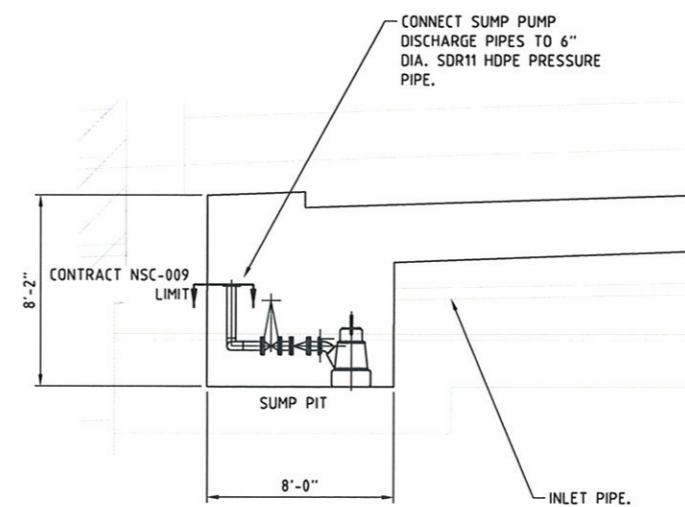
**SUMP PUMP LEVEL DETECTION**

BASED ON FLYGT MODEL 2151.181

SCALE 3/4" - 1'-0"

**NOTE:**

SUMP LEVEL DIMENSIONS ARE NOMINAL ONLY AND MAY CHANGE DEPENDANT ON PUMP SELECTION AND FINAL PIT DIMENSIONS. THE CONTRACTOR SHALL CONFIRM THE SUMP LEVEL DIMENSIONS.



**SECTION A-A**

SCALE 1/4"-1'

**NOTES:**

1. SUMP PIT DIMENSIONS SHOWN ARE NOMINAL ONLY. THE AS CONSTRUCTED DIMENSIONS ARE DEPENDANT ON CONTRACTS NSC-003 AND NSC-004.
2. THE CONTRACTOR SHALL SITE MEASURE SUMP PIT DIMENSIONS PRIOR TO PROCUREMENT AND INSTALLATION OF THE SUMP PUMPS.
3. THE CONTRACTOR SHALL PROVIDE ALL FIXINGS AND SUPPORTS TO SECURE THE SUMP PUMPS AND PIPEWORK THAT FORMS PART OF THE WORK.
4. ALL PIPEWORK IN THE SUMP PIT INCLUDING CONNECTIONS TO THE OUTLET FLANGES IS PART OF CONTRACT NSC-009, EXCEPT WHERE SPECIFICALLY DESIGNATED ON DRAWINGS.
5. INLET PIPEWORK AND DISCHARGE PIPEWORK TO THE SEWER IS NOT PART OF CONTRACT NSC-009, EXCEPT WHERE SPECIFICALLY DESIGNATED ON DRAWINGS.
6. FOR STRUCTURAL DETAILS REFER TO DRAWINGS 04TN420, 04TN431, 04TN435 AND 04TN455.
7. THE CONTRACTOR SHALL REFER TO SECTION 15445 "TUNNEL MECHANICAL DRAINAGE SYSTEMS" OF THE CONTRACT DOCUMENTS FOR FURTHER DETAILS.

MAUNSELL | AECOM

Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

C Stacey  
APPROVED  
JUNE 27, 2008  
DATE

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REVISIONS		

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REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND  
CONRAD H.B. STACEY  
R.P.E.O. 5128  
SIGNATURE: C Stacey  
PATP #002194

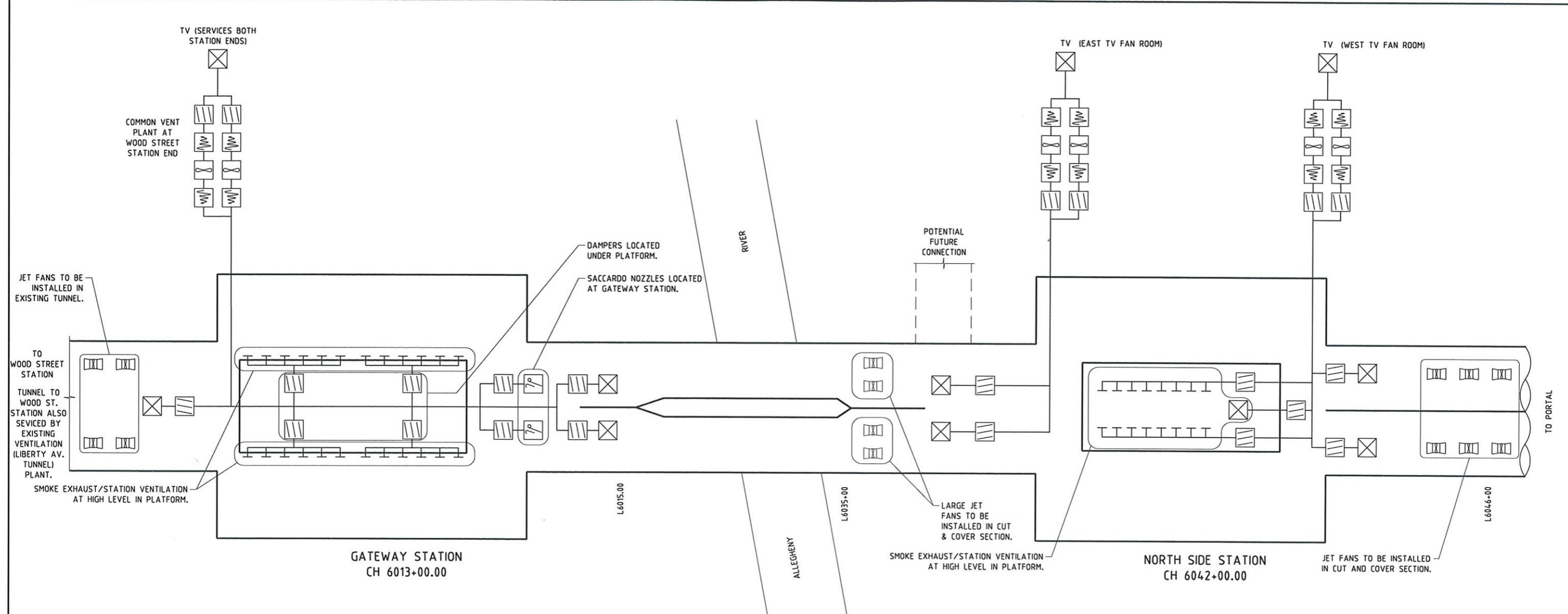
DMJM HARRIS | AECOM  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222  
APPROVED DATE

**PORT AUTHORITY OF ALLEGHENY COUNTY**

PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
GATEWAY LINE  
GATEWAY STATION SUMP PUMP PLAN

Port Authority	CONTRACT NO. NSC-009
DWG. NO. MC-103	SHT. 620



## NOTES:

- NOTES:**

  1. SCHEMATICS ARE INDICATIVE ONLY AND DO NOT NECESSARILY INDICATE THE LOCATION OR ORIENTATION OF MECHANICAL EQUIPMENT.
  2. NUMBER OF TRACKWAY EXHAUST INLET GRILLS INDICATIVE ONLY.
  3. NUMBER OF DAMPERS INDICATIVE ONLY.
  4. JET FAN AND SHAFT/TUNNEL ENTRY POINTS ARE SYMBOLIC ONLY AND DO NOT NECESSARILY INDICATE THE LOCATION/ORIENTATION IN THE TUNNEL.
  5. CHAINAGES SHOWN ARE APPROXIMATE ONLY

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Maunsell Australia Pty Ltd A.B.N. 20 093 846 92

JUNE 27, 2008  
DATE

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**DMJM HARRIS | AECO**  
FOUR GATEWAY CENTER  
20TH FLOOR

AND  
STEADY

FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH PA 15222

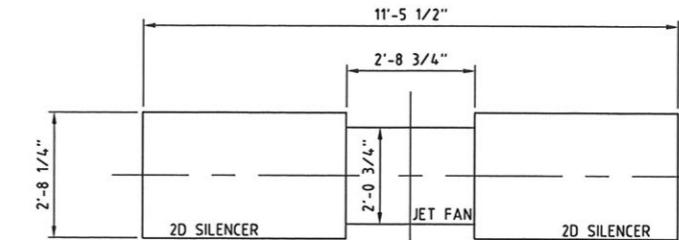
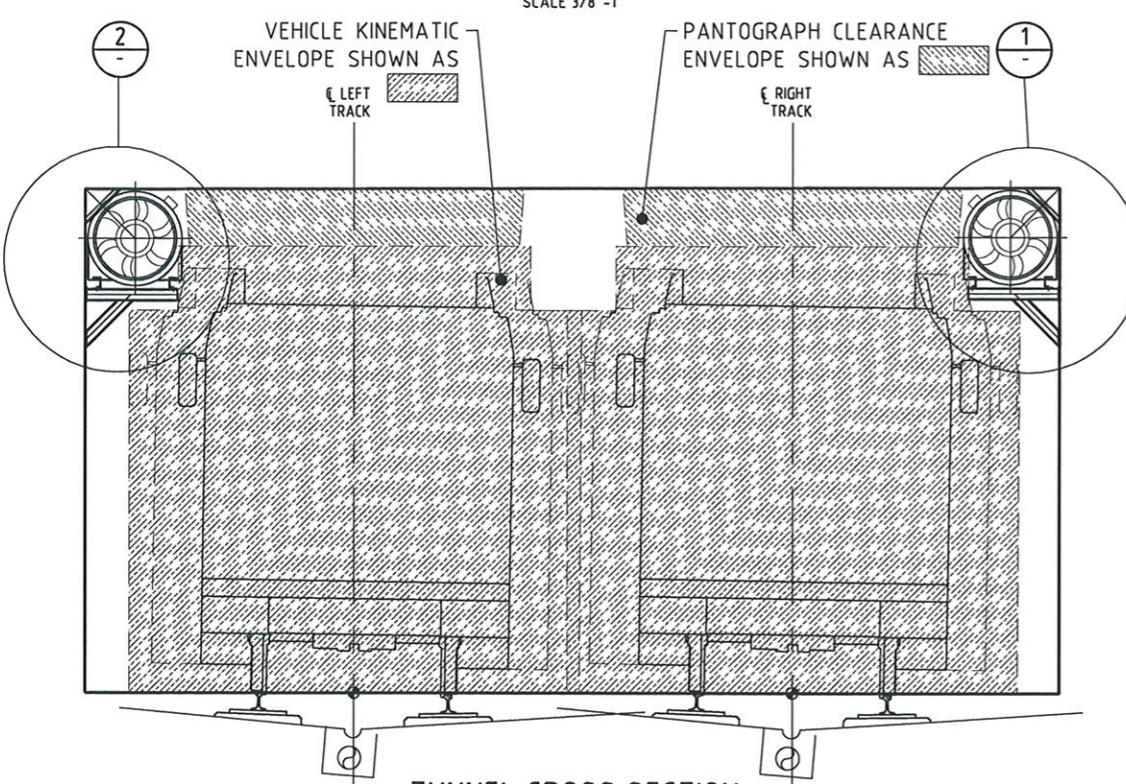
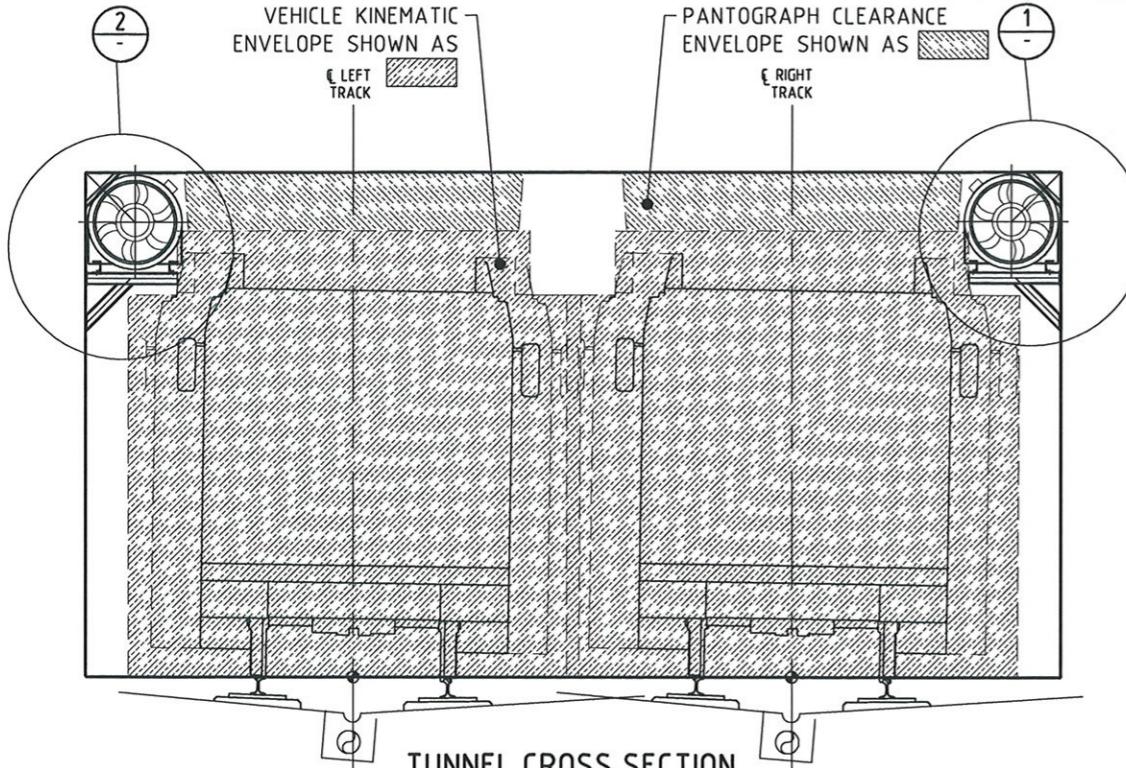
APPROVED

PORT AUTHORITY OF ALLEGHENY COUNTY

PITTSBURGH PENNSYLVANIA

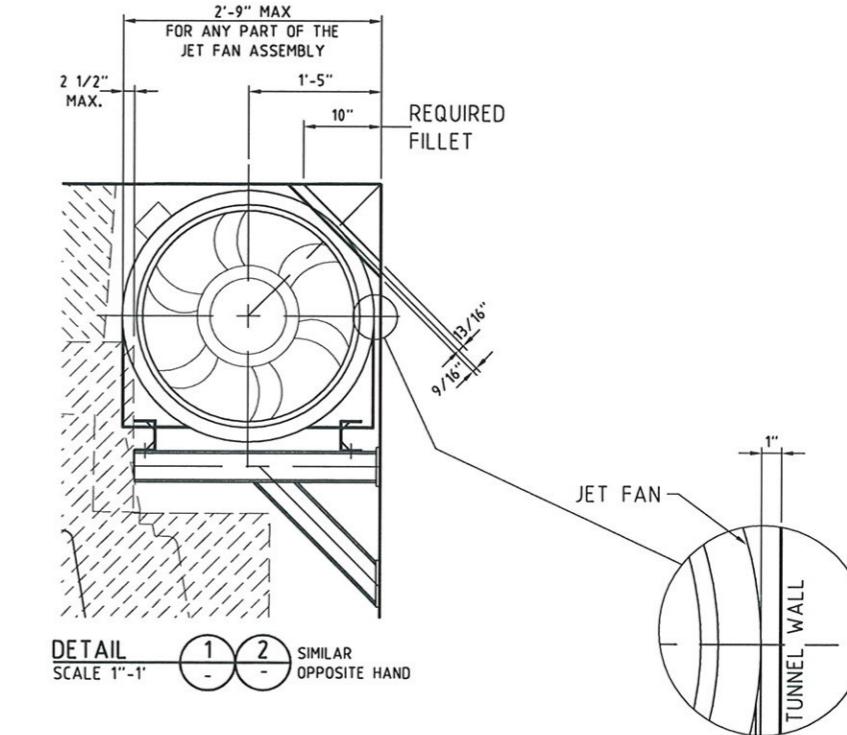
**NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
GATEWAY LINE  
VENTILATION SCHEMATIC**

CONTRACT NO. NSC-009



**TYPICAL 25" (630mm)  
JET FAN ARRANGEMENT**

SCALE 1/2" - 1'-0"



**NOTES:**

1. THE PANTOGRAPH CLEARANCE ENVELOPE SHOWN EXCLUDES 1.76 DEGREE ADJUSTMENT FOR SUPER ELEVATION.
2. THE TUNNEL SECTION SHOWN IS BASED ON A TRI-STATE DESIGN AND DEVELOPMENT SURVEY OF 3/29/04.
3. JET FAN DIMENSIONS ARE NOMINALLY BASED ON FLAKT WOODS 630 SERIES JET FANS WITH 2D SILENCERS.
4. THE CONTRACTOR SHALL CONFIRM VEHICLE KINEMATIC ENVELOPE AND PANTOGRAPH CLEARANCES WITH AUTHORITY, SURVEY TUNNEL SECTIONS AND SHOW THAT JET FAN INSTALLATIONS DO NOT ENCROACH INTO THE CLEARANCE ENVELOPES ANY MORE THAN SHOWN ON THIS DRAWING PRIOR TO PROCUREMENT AND INSTALLATION.
5. THE JET FAN LOCATION SHALL BE CONFIRMED BY THE CONTRACTOR PRIOR TO INSTALLATION. LOCATION DEPENDANT ON THE TUNNEL CONDITION AND SOUNDNESS OF THE TUNNEL FILLET FOR GRINDING BACK TO ALLOW THE JET FANS TO BE INSTALLED. STRUCTURAL ENGINEERS REPORT REQUIRED PRIOR TO CONSTRUCTION. CONTRACTOR SHALL BE RESPONSIBLE FOR GRINDING BACK THE TUNNEL FILLET.
6. JET FAN MOUNTINGS SHOWN ARE TYPICAL. CONTRACTOR SHALL SUPPLY MOUNTINGS SUITABLE FOR JET FAN SELECTED. CONTRACTOR SHALL CONFIRM SELECTED MOUNTING DOES NOT ENCROACH INTO THE CLEARANCE ENVELOPE ANY MORE THAN SHOWN ON THIS DRAWING. VIBRATION ISOLATORS TO BE INCLUDED.
7. THE CONTRACTOR SHALL REFER TO SECTION 45000 "TUNNEL VENTILATION JET FANS" OF THE CONTRACT DOCUMENTS FOR FURTHER DETAILS.
8. REFER TO DRAWING MC-108 FOR JET FAN LOCATIONS.

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Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

C Stacey  
APPROVED  
JUNE 27, 2008  
DATE

NO.	DATE	DESCRIPTION
		REVISIONS

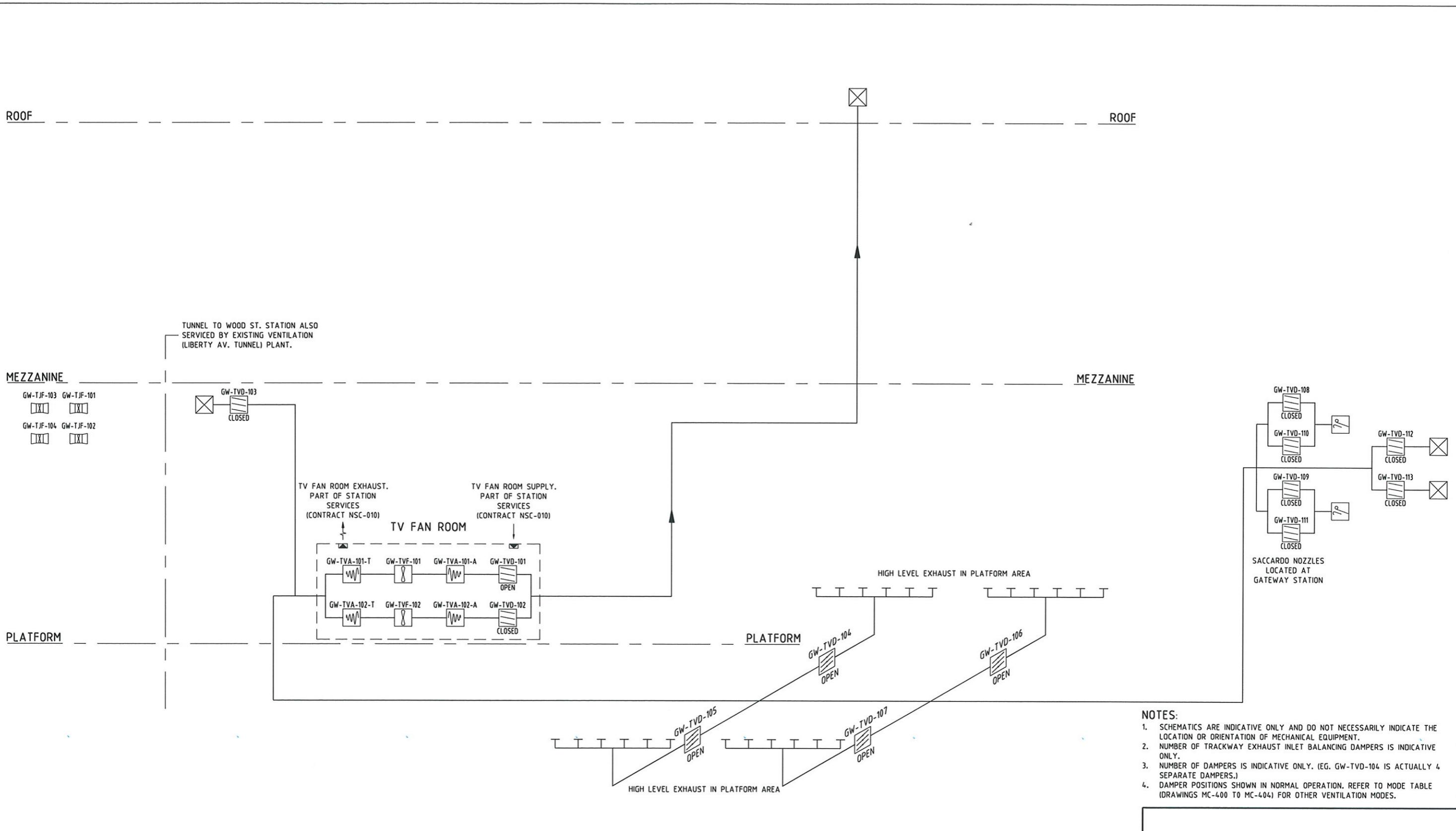
THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.

REGISTERED  
PROFESSIONAL  
ENGINEER OF  
QUEENSLAND  
CONRAD H.B. STACEY  
RPEQ 5128  
SIGNATURE  
PATP #002194

DMJM HARRIS | AECOM  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222  
APPROVED  
DATE

DESIGNED AP  
DRAWN IR  
CHECKED PG  
IN CHARGE CS  
DATE 06/27/08  
SCALE AS NOTED

**PORT AUTHORITY OF ALLEGHENY COUNTY**  
PITTSBURGH PENNSYLVANIA  
NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
GATEWAY LINE  
JET FAN SECTIONS - EXISTING TUNNEL TO WOOD ST. STATION  
Port Authority CONTRACT NO. NSC-009  
DWG. NO. MC-105 SHT. 622



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C Stacey APPROVED JUNE 27 DA

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**DMJM HARRIS | AECO**

OF  
ND  
ACBY

FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

28

~~APPROVED~~

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# **PORT AUTHORITY OF ALLEGHENY COUNTY**

PITTSBURGH PENNSYLVANIA

## **NORTH SHORE CONNECTOR**

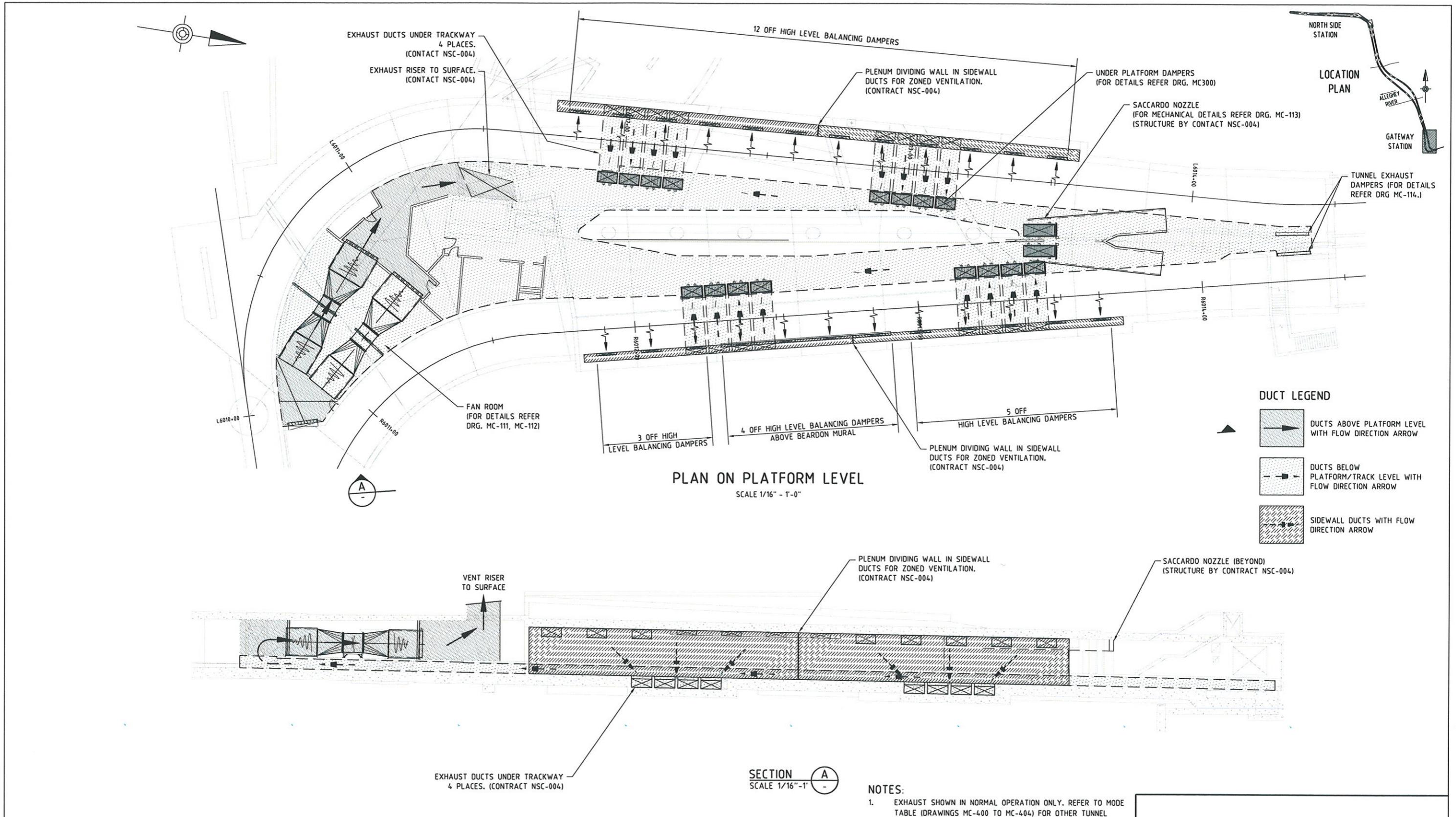
NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)

### **GATEWAY STATION**

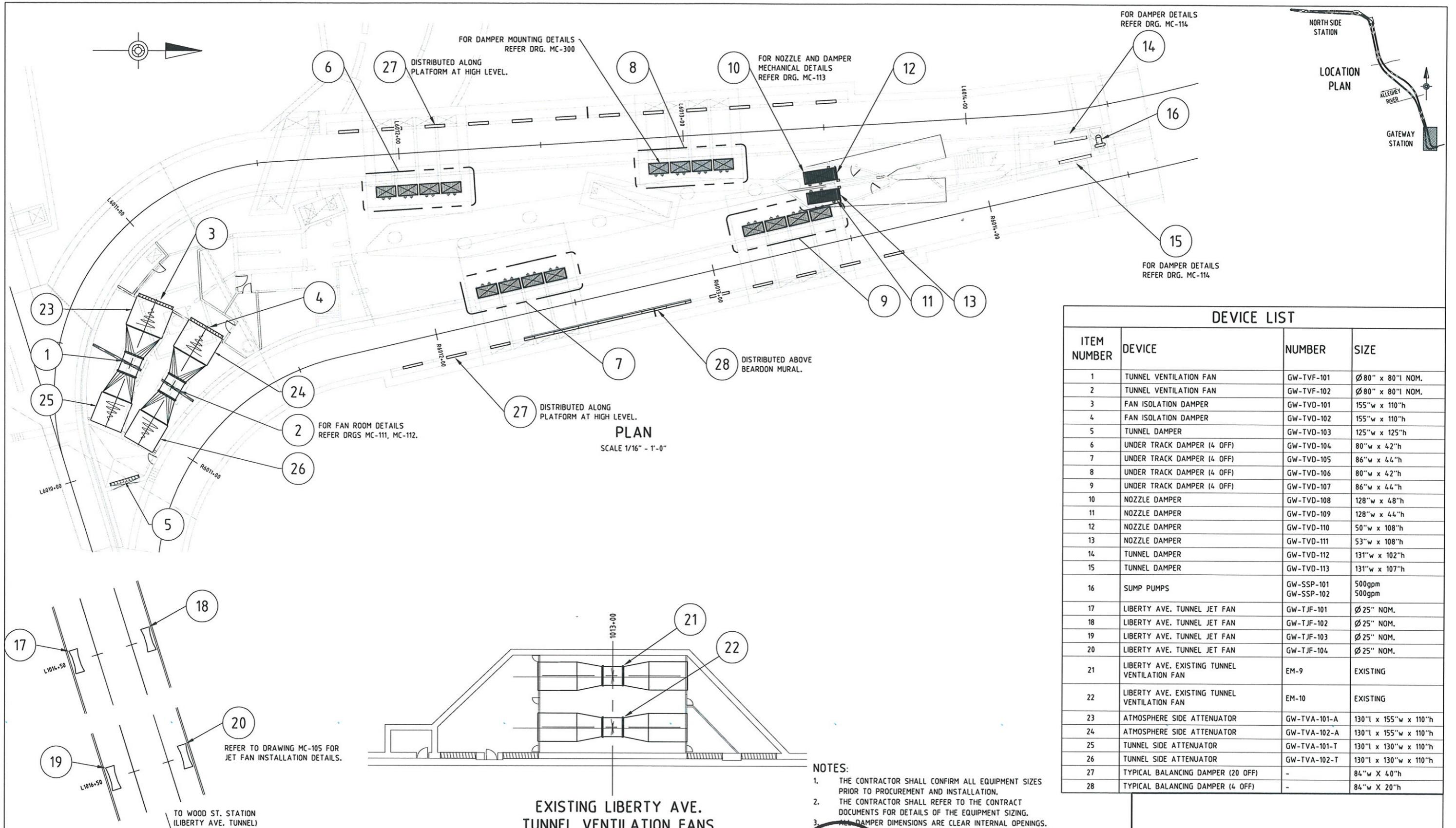
## **STATION TV FLOW SCHEMATIC**

**CONTRACT NO.**

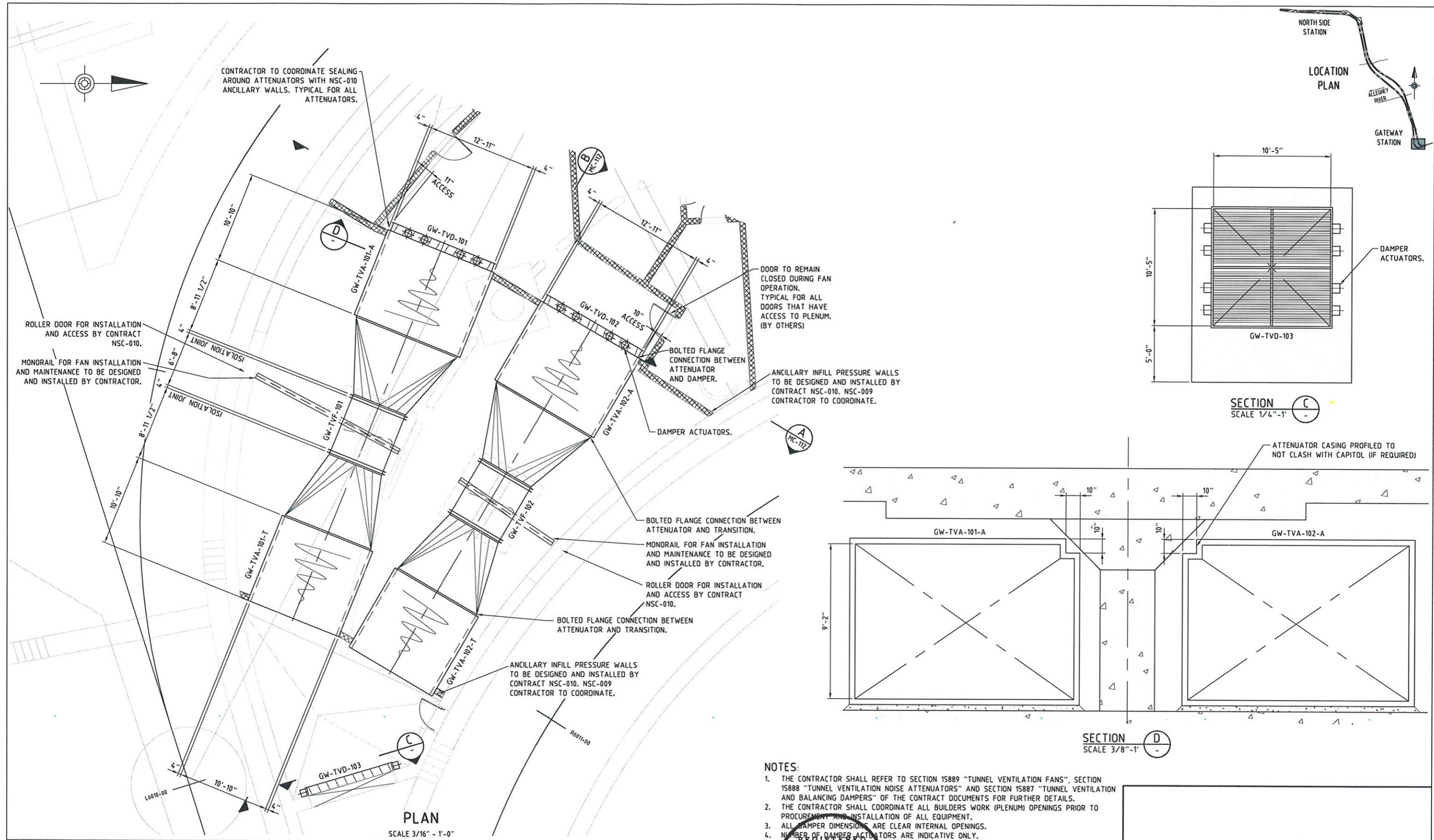
DWG-NC MG-106



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Maunsell Australia Pty Ltd A.B.N. 20 093 846 925 C. Stacey APPROVED JUNE 27, 2008 DATE						DMJM HARRIS   AECOM		FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222 SIGNATURE PATP #002194		Port Authority CONTRACT NO. NSC-009 DWG. NO. MC-107 SHT. 624	
NO.	DATE	DESCRIPTION	REVISIONS			APPROVED	DATE				



MAUNSELL   AECOM				CONRAD H.B. STACEY RPEO 5128 SIGNATURE PATP #002194		PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM WIDE) GATEWAY STATION MECHANICAL EQUIPMENT			
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925 <i>C Stacey</i> APPROVED JUNE 27, 2008 DATE		THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.		DMJM HARRIS   AECOM FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222 <i>C Stacey</i> SIGNATURE PATP #002194		Port Authority CONTRACT NO. NSC-009 DWG. NO. MC-108 SHT. 625			
NO.	DATE	DESCRIPTION	REVISIONS	DESIGNED AP	DRAWN IK	CHECKED PG	IN CHARGE CS	DATE 06/27/08	SCALE 1/16" - 1'-0"
				APPROVED	DATE				

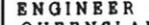


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C Stacey JUNE 27  
APPROVED DA

JUNE 27, 2008  
DATE

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 <p><b>PROFESSIONAL ENGINEER OF QUEENSLAND</b></p> <p><b>CONRAD H.B. STACEY</b></p> <p>RPEQ 5128</p> <p><i>C. Stacey</i></p> <hr/> <p>SIGNATURE</p>	<p><b>DMJM HARRIS   AECC</b></p> <p>FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222</p> <hr/> <p>APPROVED</p> <p>DATE</p>
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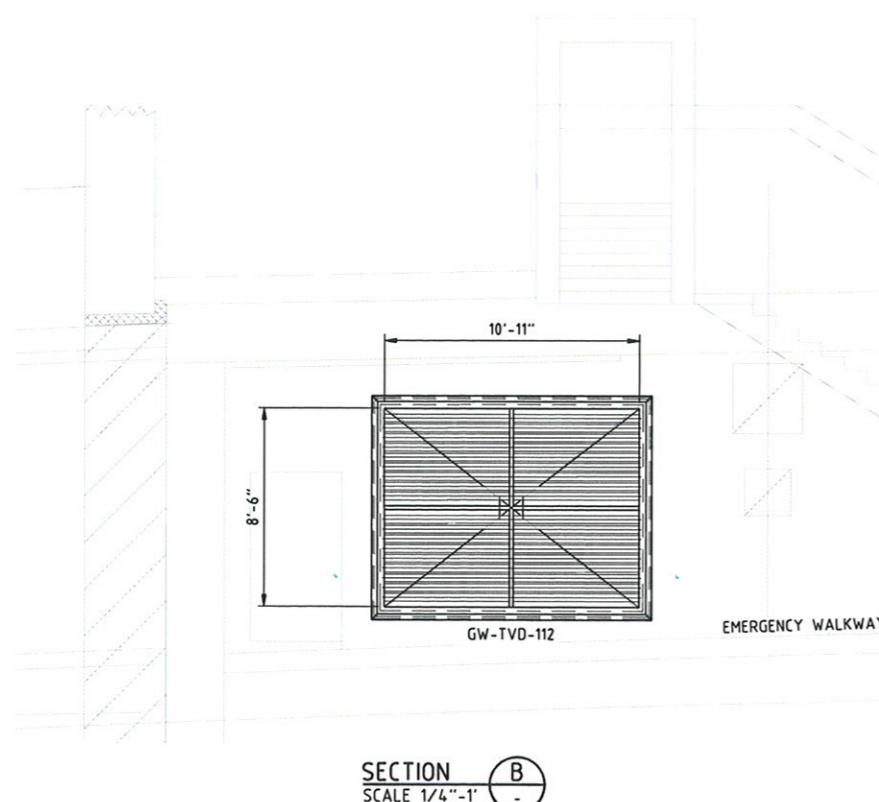
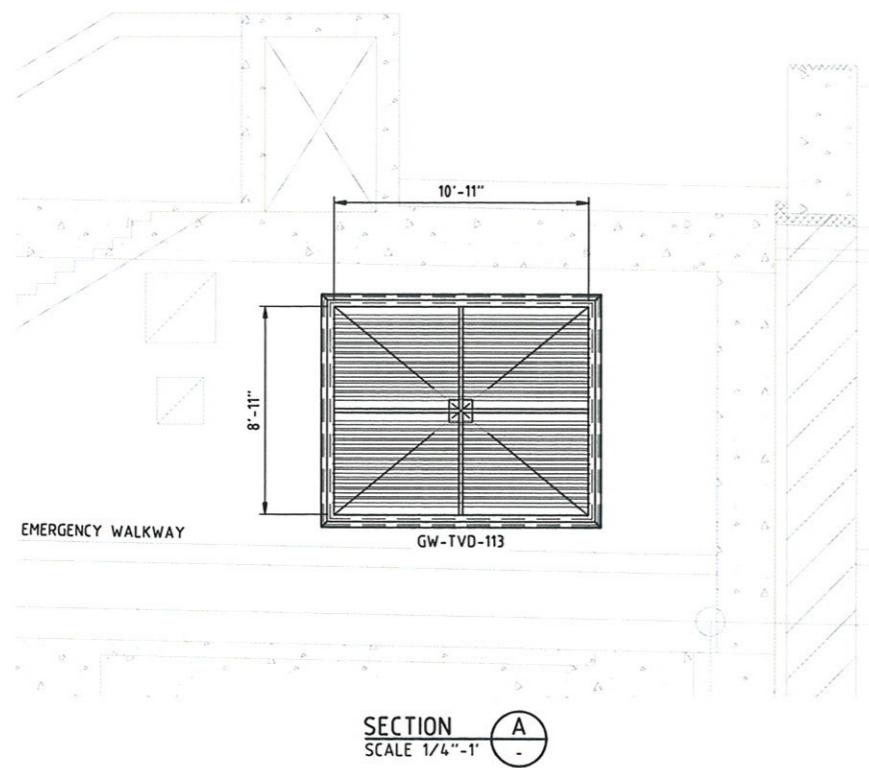
**DMJM HARRIS** | **AECOM**  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

**PITTSBURGH** **PENNSYLVANIA**

**NORTH SHORE CONNECTOR**  
**NSC TRAIN SYSTEM (SYSTEM WIDE)**  
**GATEWAY STATION**  
**TV FAN ROOM PLAN**







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JUNE 27, 2008

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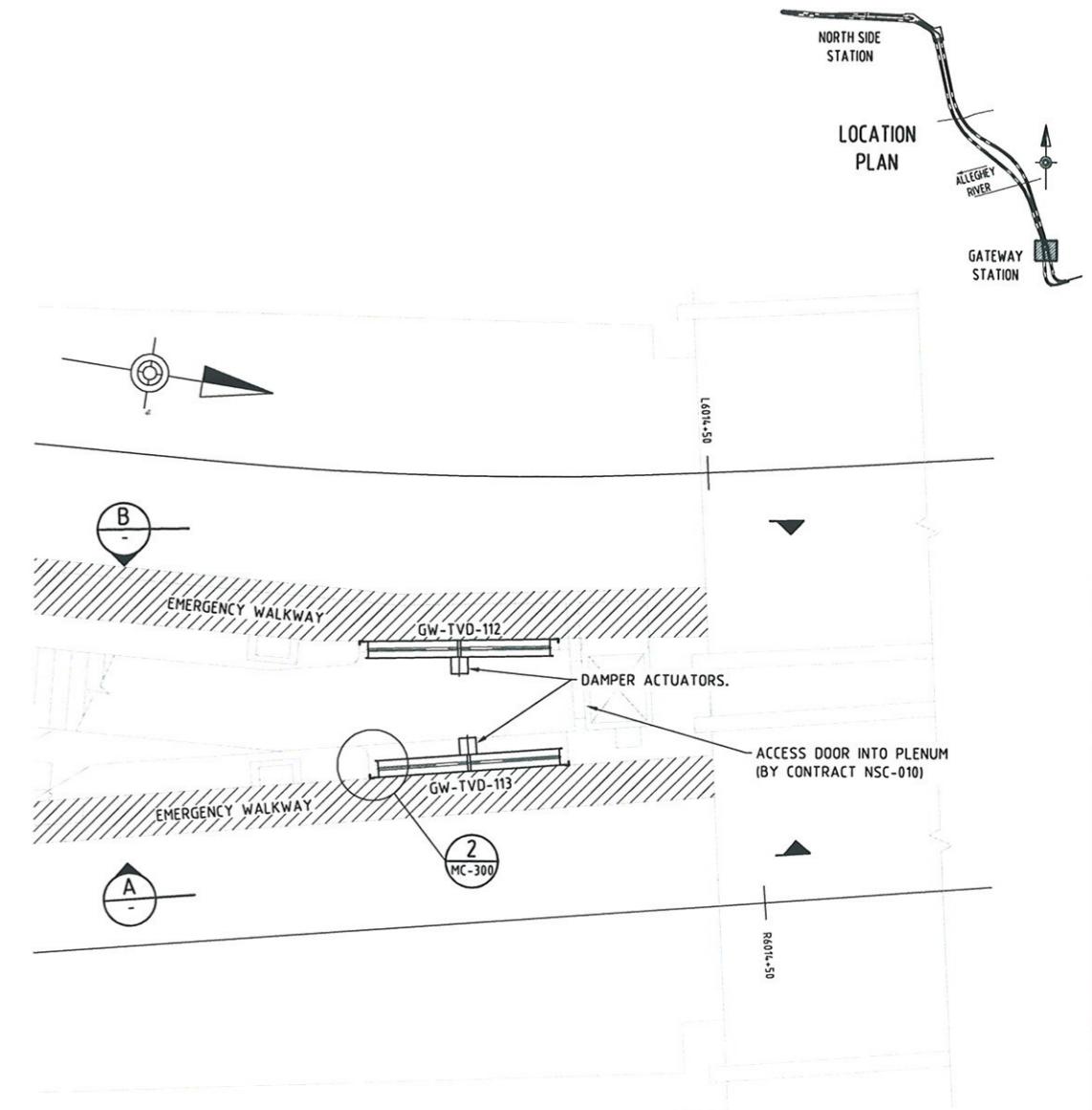
**DMJM HARRIS | AECOM**

FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

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APPROVED

**PLAN**



## NOTES:

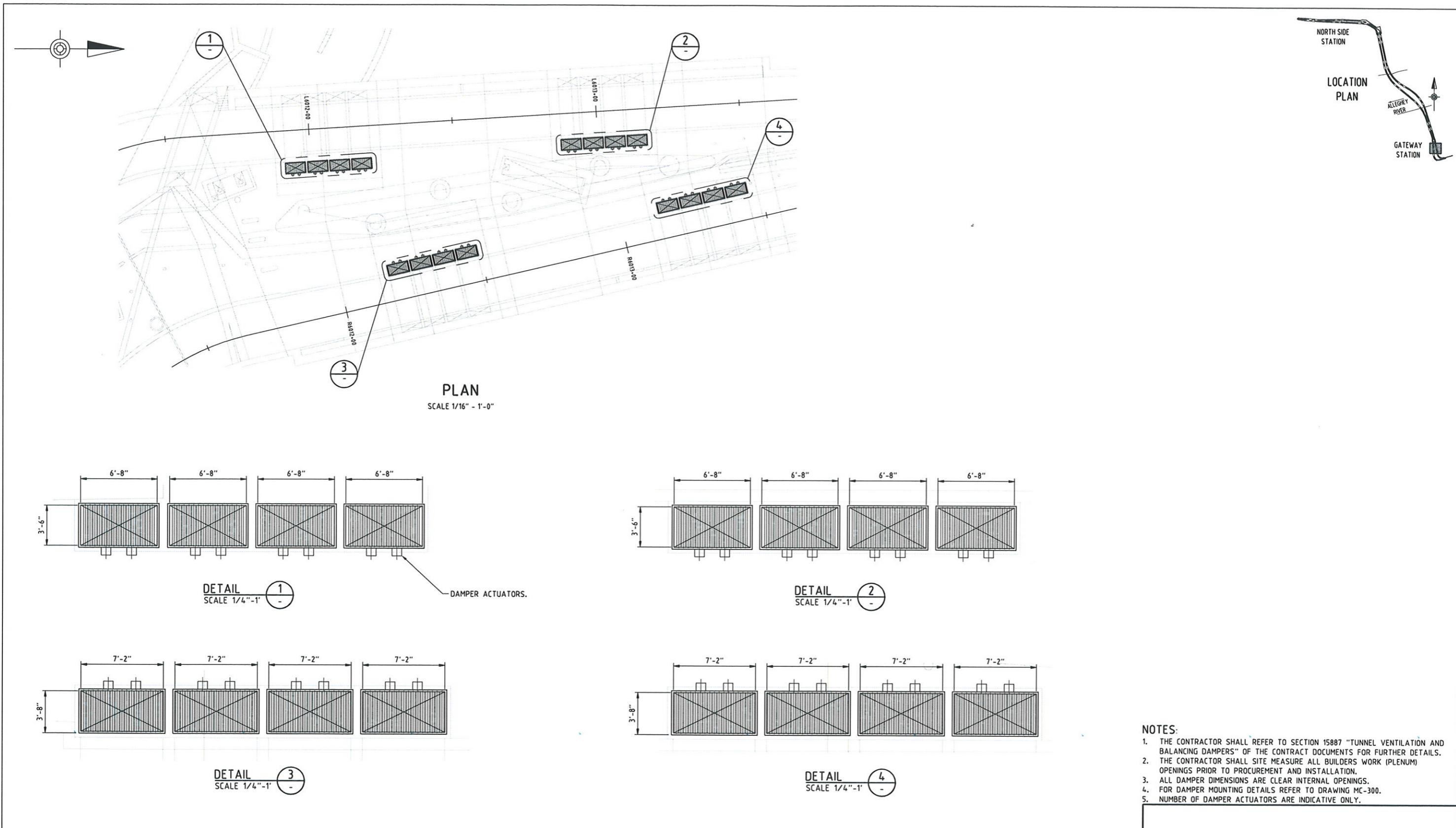
- NOTES:

  1. THE CONTRACTOR SHALL REFER TO SECTION 15887 "TUNNEL VENTILATION AND BALANCING DAMPERS" OF THE CONTRACT DOCUMENTS FOR FURTHER DETAILS.
  2. THE CONTRACTOR SHALL COORDINATE ALL BUILDERS WORK (PLENUM) OPENINGS PRIOR TO PROCUREMENT AND INSTALLATION.
  3. THE CONTRACTOR SHALL ENSURE THAT THE DAMPERS DO NOT PROTRUDE INTO THE EMERGENCY WALKWAY.
  4. ALL DAMPER DIMENSIONS ARE CLEAR INTERNAL OPENINGS.
  5. FOR STRUCTURAL DETAILS OF THE ADJOINING UNDER PLATFORM PLENUM REFER TO DRAWINGS 04TN431, 04TN435, 04TN453, 04TN454 AND 04TN455.
  6. NUMBER OF DAMPER ACTUATORS ARE INDICATIVE ONLY.

**PORT AUTHORITY OF ALLEGHENY COUNTY**

**NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
GATEWAY STATION  
NORTHERN TUNNEL DAMPERS**

**Port Authority**  
connecting people to life



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NO.	DATE	DESCRIPTION	REVISIONS	

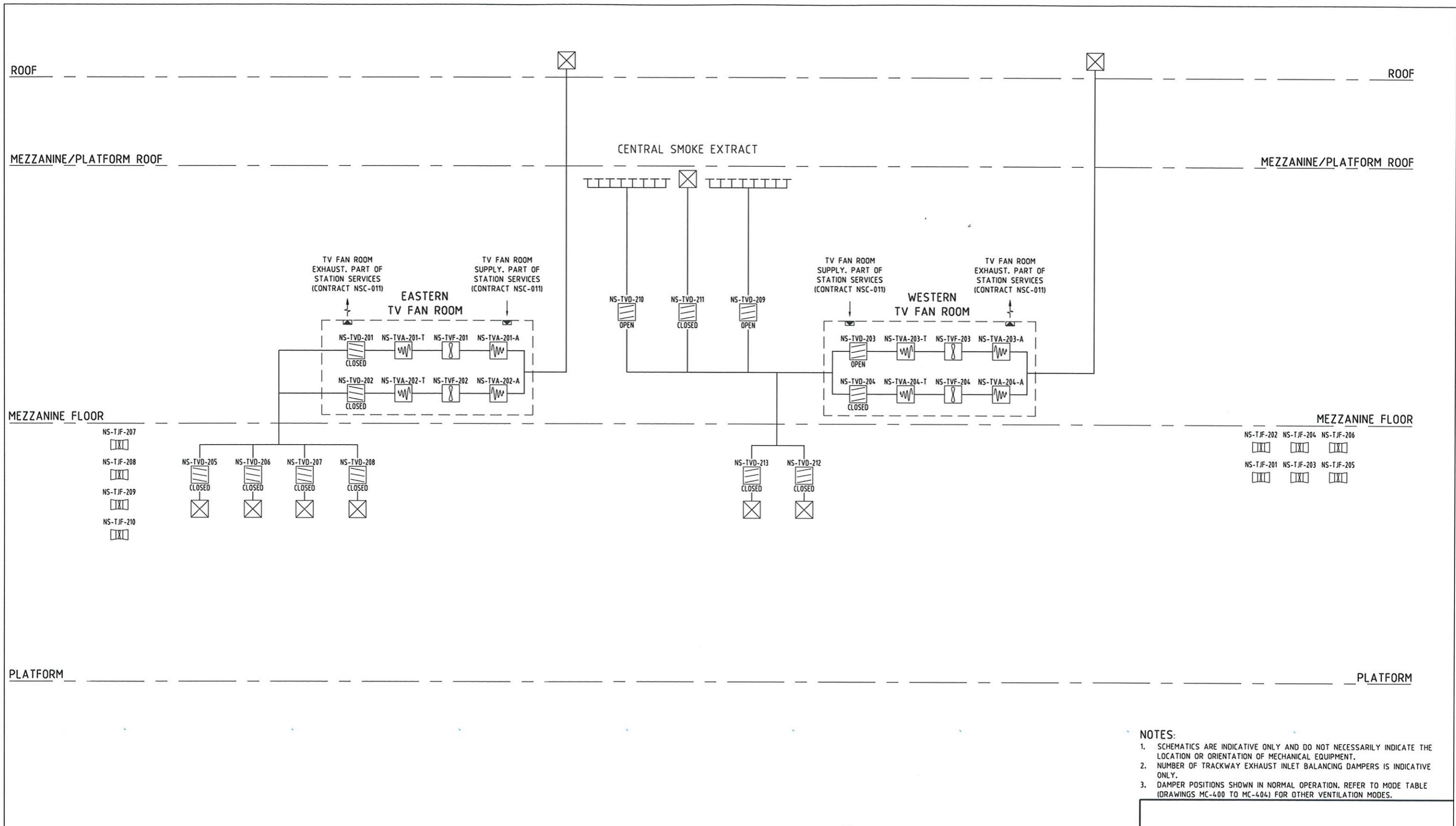
THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.

REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND CONRAD H.B. STACEY RPEQ 5128 <i>C Stacey</i> SIGNATURE PATP #002194	
APPROVED	DATE

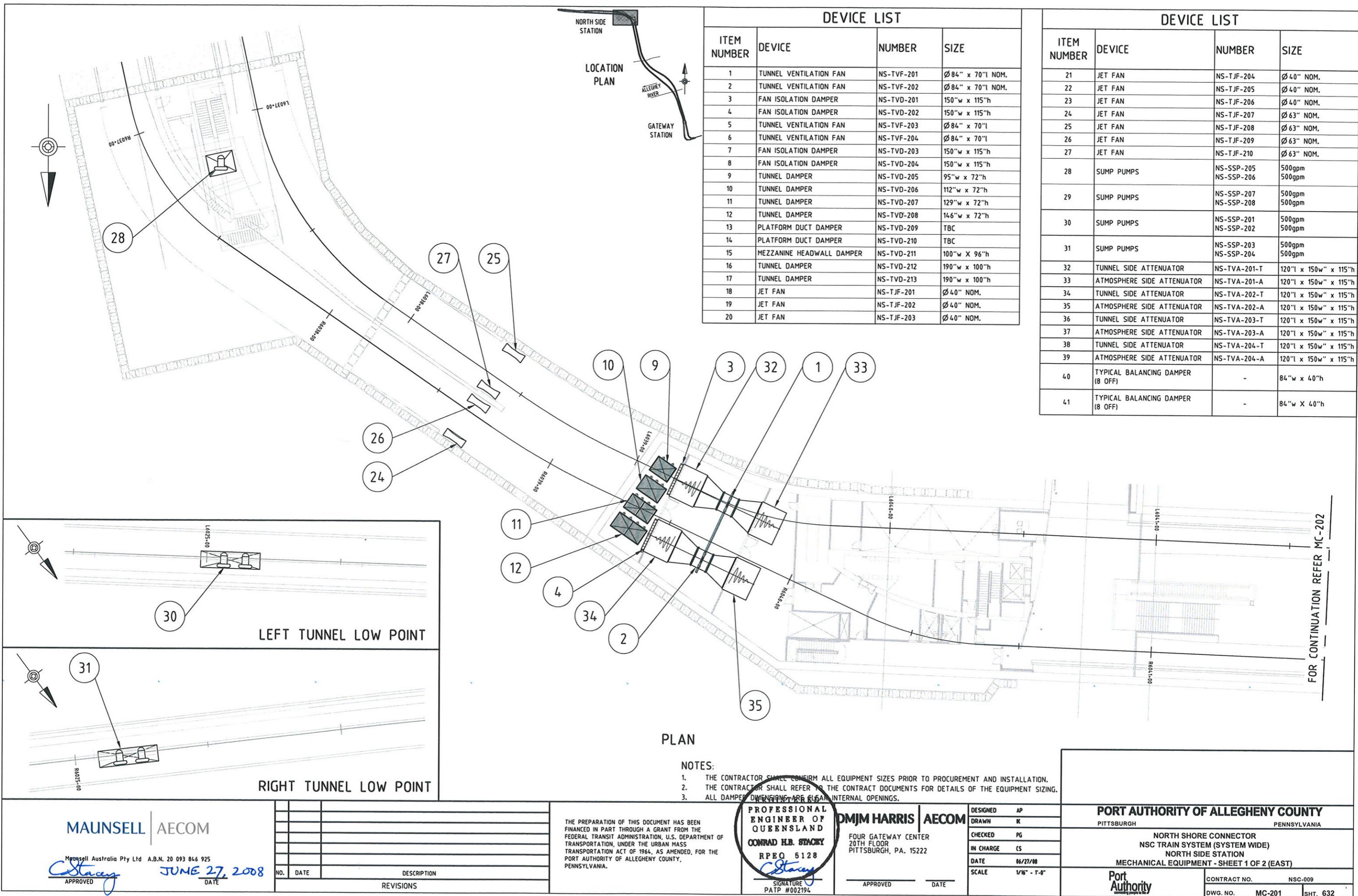
DMJM HARRIS | AECOM  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

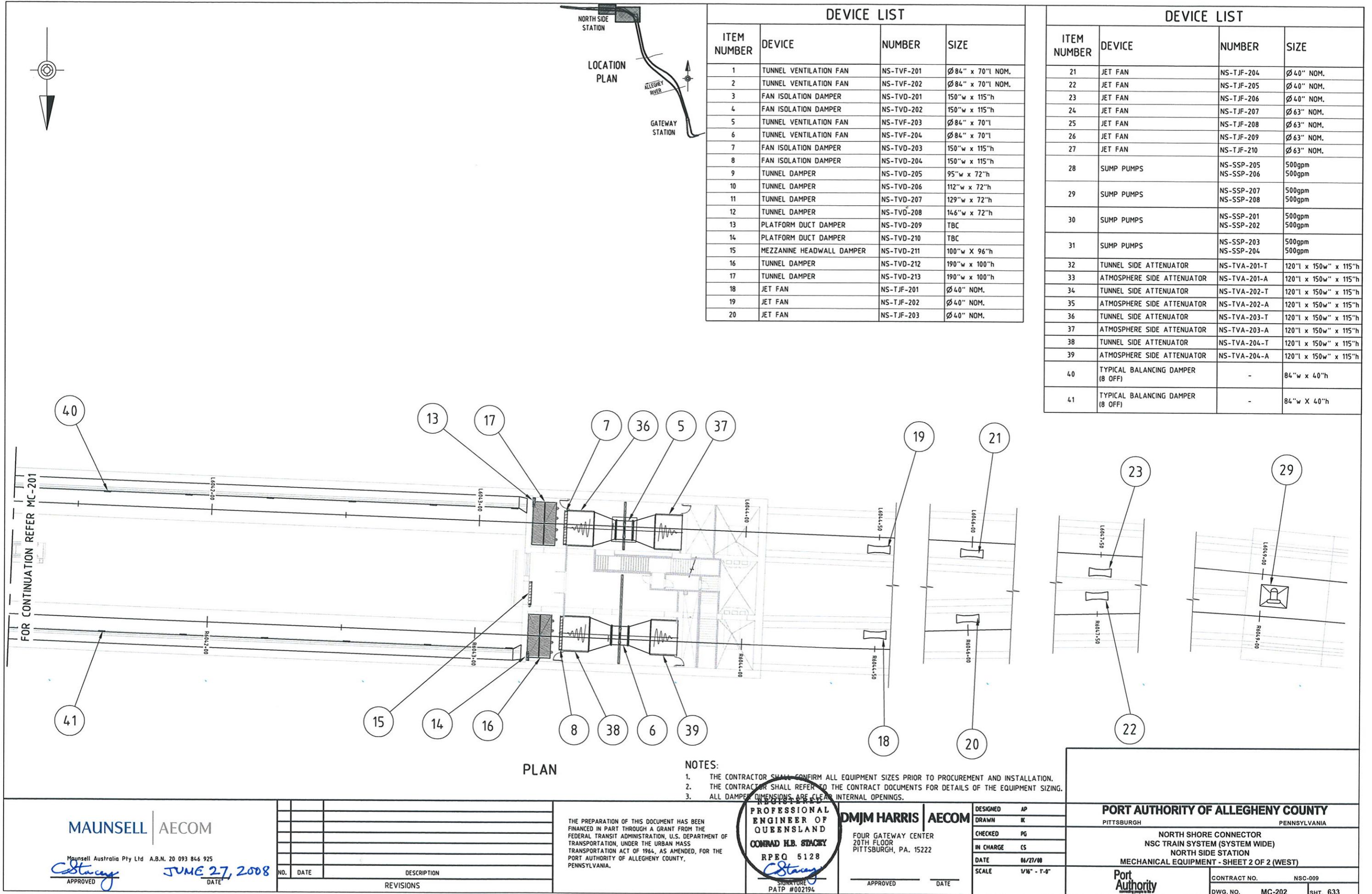
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DRAWN KK  
CHECKED PG  
IN CHARGE CS  
DATE 06/27/08  
SCALE AS NOTED

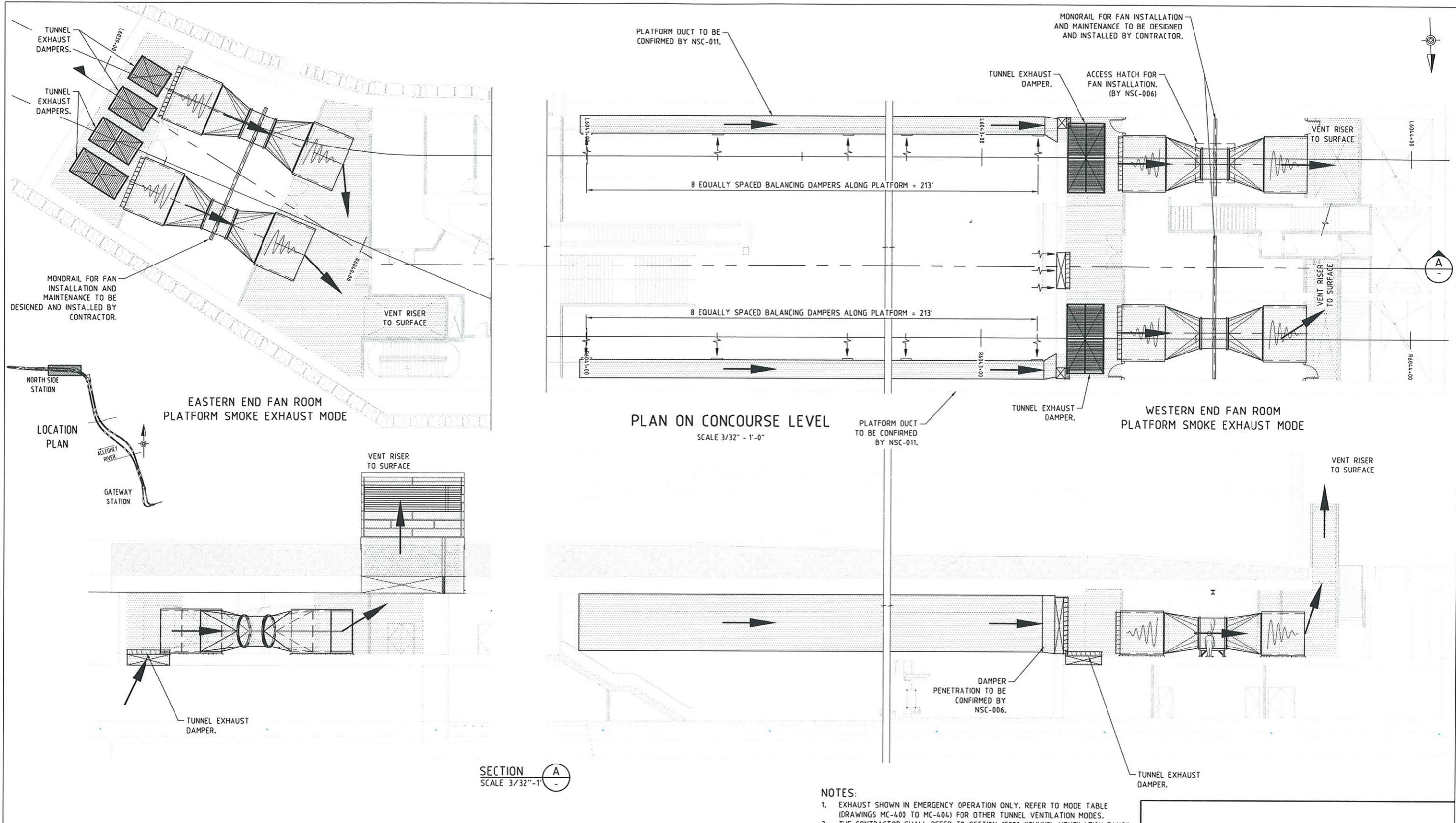
PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH PENNSYLVANIA	
NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM WIDE) GATEWAY STATION UNDER PLATFORM DAMPERS	
Port Authority	CONTRACT NO. NSC-009
DWG. NO. MC-115	SHT. 630



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Maunsell Australia Pty Ltd A.B.N. 20 093 846 925 <i>C Stacey</i> APPROVED		JUNE 27, 2008 <i>C Stacey</i> DATE		NO. DATE DESCRIPTION REVISIONS		REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND CONRAD H.B. STACEY RPEQ 5128 <i>C Stacey</i> SIGNATURE PATP #002194		DESIGNED AP DRAWN K CHECKED PG IN CHARGE CS DATE 06/27/08 SCALE NTS APPROVED DATE	
				THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.		DMJM HARRIS   AECOM FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222		PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH PENNSYLVANIA NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM WIDE) NORTH SIDE STATION STATION TV FLOW SCHEMATIC	
								Port Authority CONTRACT NO. NSC-009 DWG. NO. MC-200 SHT. 631	







**MAUNSELL | AECOM**  
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925  
*C Stacey*  
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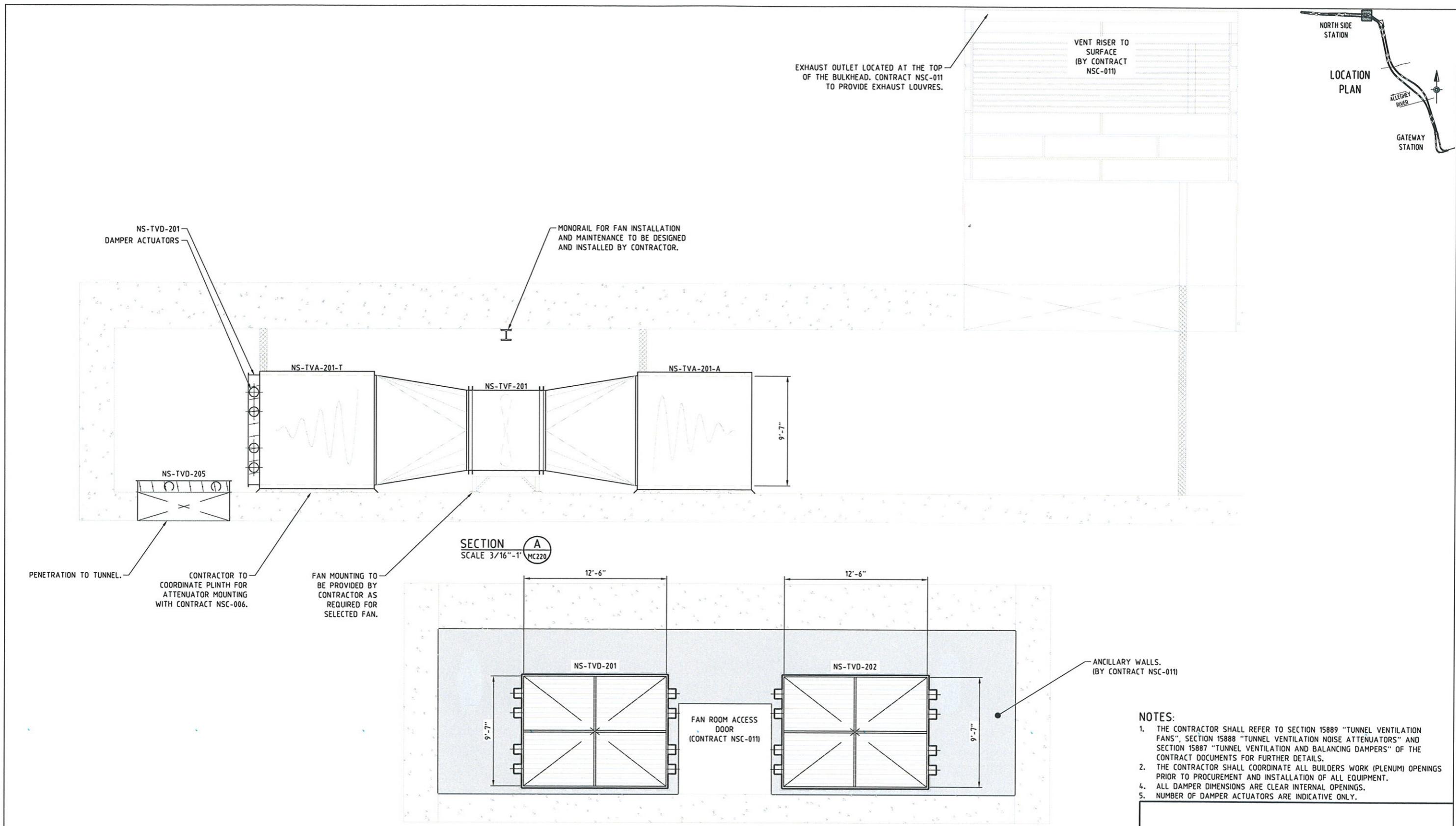
PROFESSIONAL  
ENGINEER OF  
QUEENSLAND  
**CONRAD H.B. STACEY**  
RPEQ 5128  
*C Stacey*  
SIGNATURE  
PATP #002194

**DMJM HARRIS | AECOM**  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222  
APPROVED \_\_\_\_\_ DATE \_\_\_\_\_

DESIGNED AP  
DRAWN K  
CHECKED PG  
IN CHARGE CS  
DATE 06/27/08  
SCALE AS NOTED

**PORT AUTHORITY OF ALLEGHENY COUNTY**  
PITTSBURGH PENNSYLVANIA  
NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
NORTH SIDE STATION  
TV EXHAUST DUCT PLAN  
**Port Authority** CONTRACT NO. NSC-009  
DWG. NO. MC-210 SHT. 634





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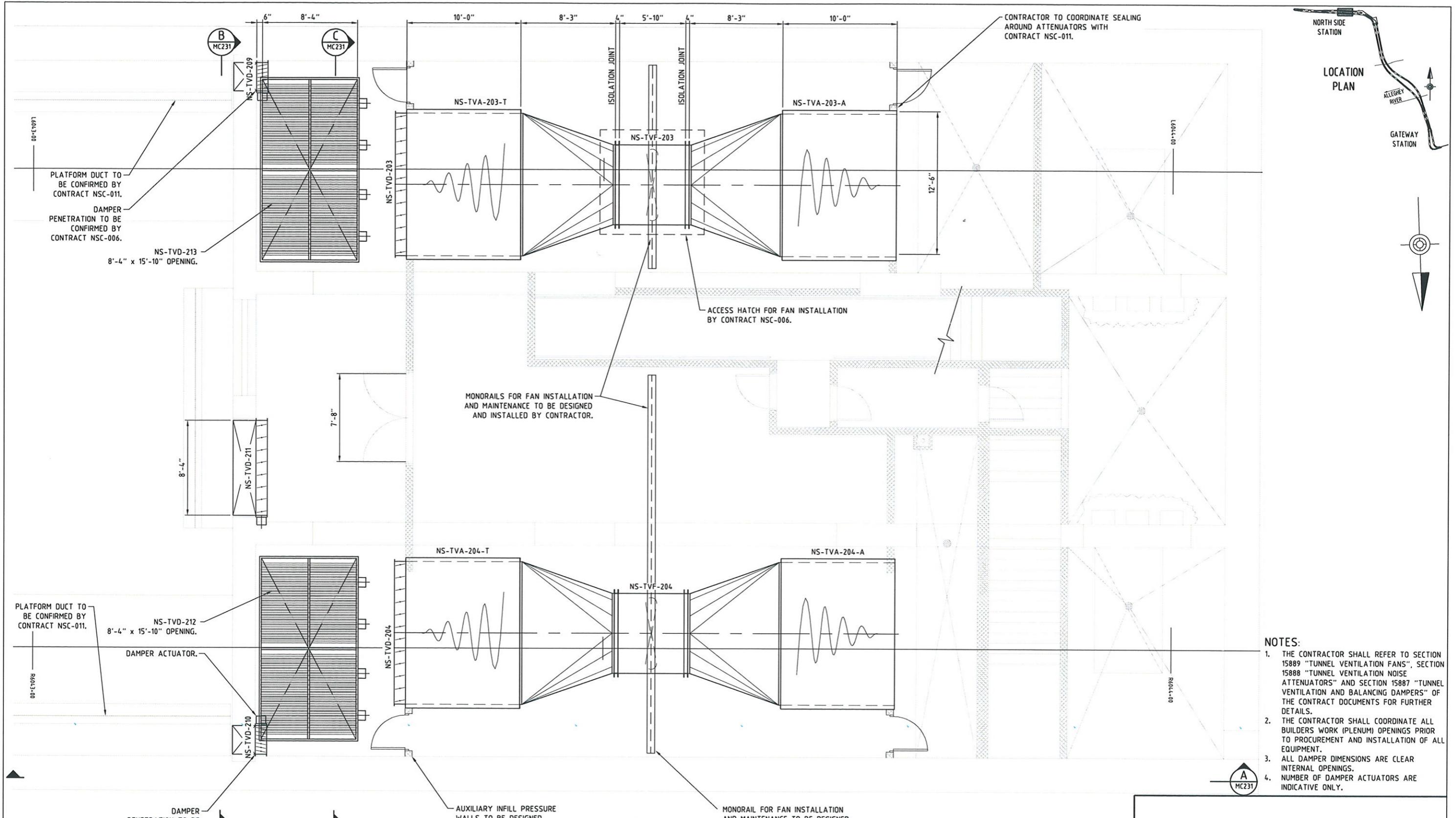
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REGISTERED  
PROFESSIONAL  
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QUEENSLAND  
**CONRAD H.R. STACEY**  
RPEQ 5128  
*C. Stacey*  
SIGNATURE  
PATP #002194

DMJM HARRIS | AECOM  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222  
APPROVED \_\_\_\_\_ DATE \_\_\_\_\_

DESIGNED AP  
DRAWN IK  
CHECKED PG  
IN CHARGE CS  
DATE 06/27/08  
SCALE AS NOTED

PORT AUTHORITY OF ALLEGHENY COUNTY	
PITTSBURGH	PENNSYLVANIA
NORTH SHORE CONNECTOR	
NSC TRAIN SYSTEM (SYSTEM WIDE)	
NORTH SIDE STATION	
EASTERN END, TV FAN ROOM ELEVATIONS	
Port Authority	CONTRACT NO. NSC-009
DWG. NO. MC-221	SHT. 636



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McGraw-Hill Construction  
McGraw-Hill Australia Pty Ltd A.B.N. 20 093 846 925

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REGISTERED  
PROFESSIONAL  
ENGINEER OF  
QUEENSLAND  
**CONRAD H.B. STACEY**  
RPEQ 5128  
SIGNATURE  
PATP #002104

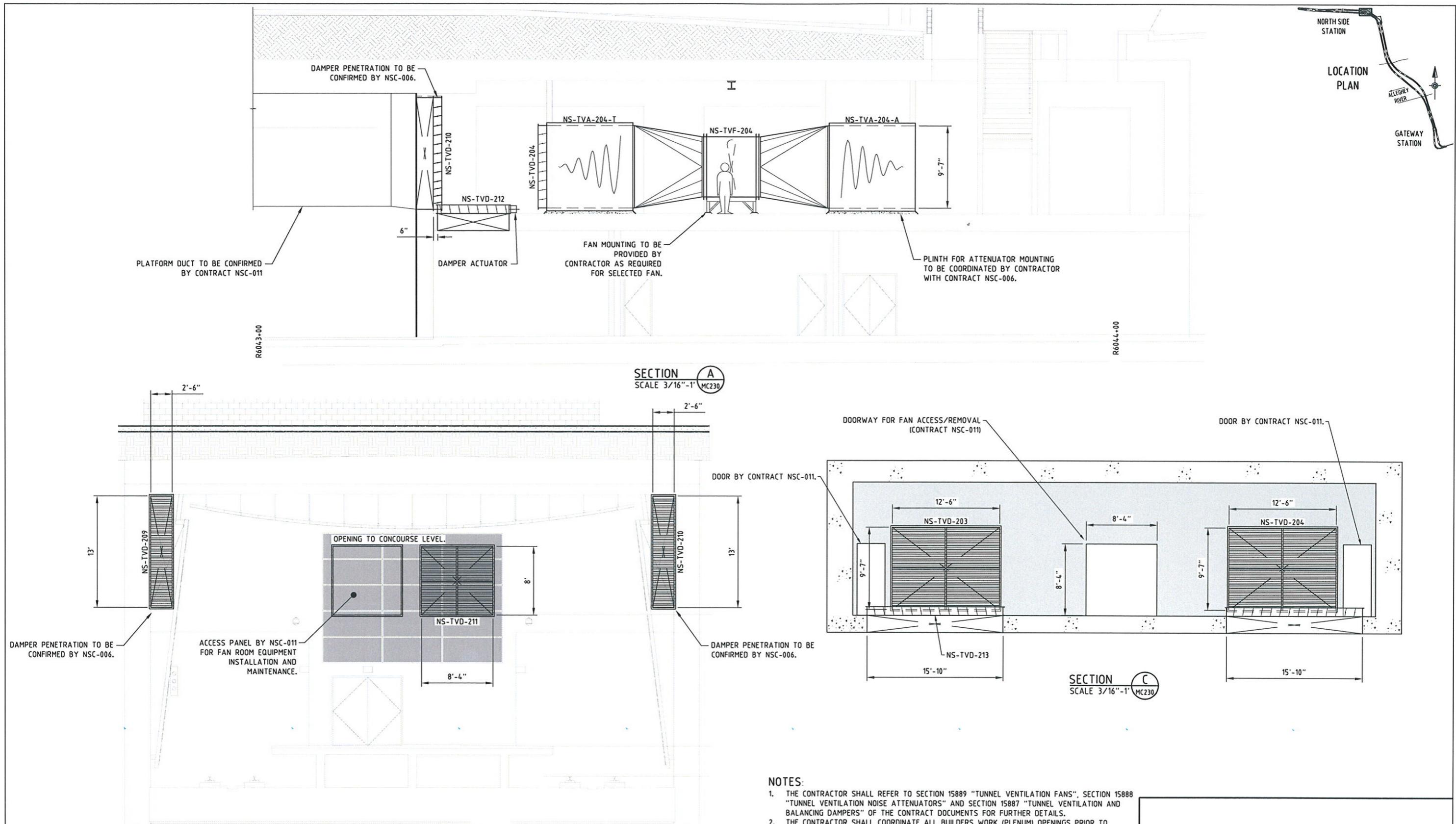
DMJM HARRIS | AECOM  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

APPROVED DATE

PORT AUTHORITY OF ALLEGHENY COUNTY  
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
NORTH SIDE STATION  
WESTERN END, TV FAN ROOM PLAN

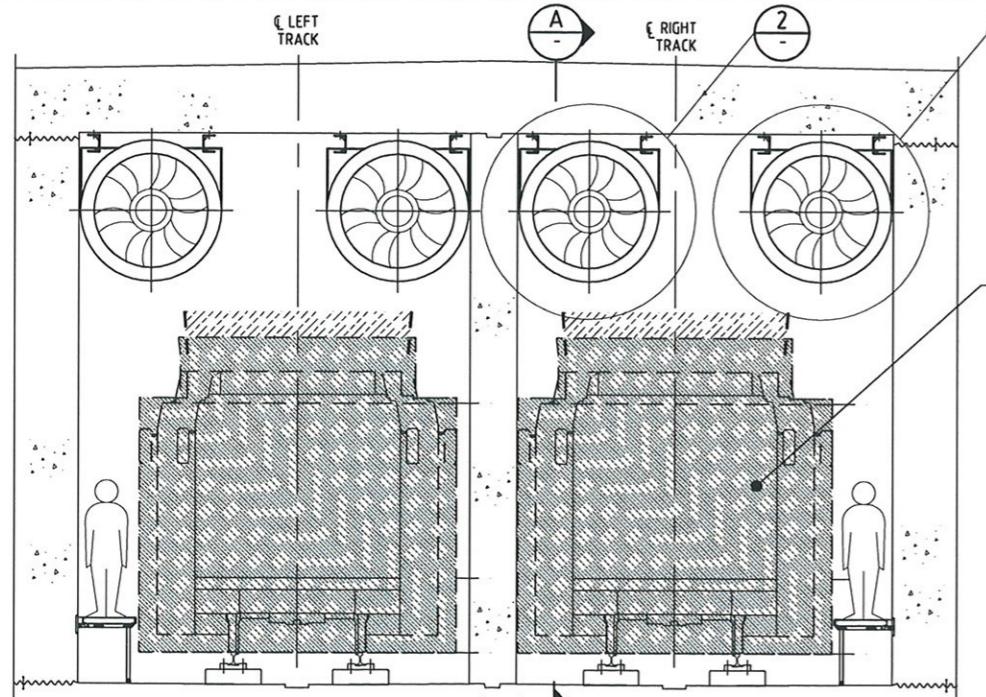
Port Authority	CONTRACT NO.	NSC-009
	DWG. NO.	MC-230
	SHT.	637



NOTES:

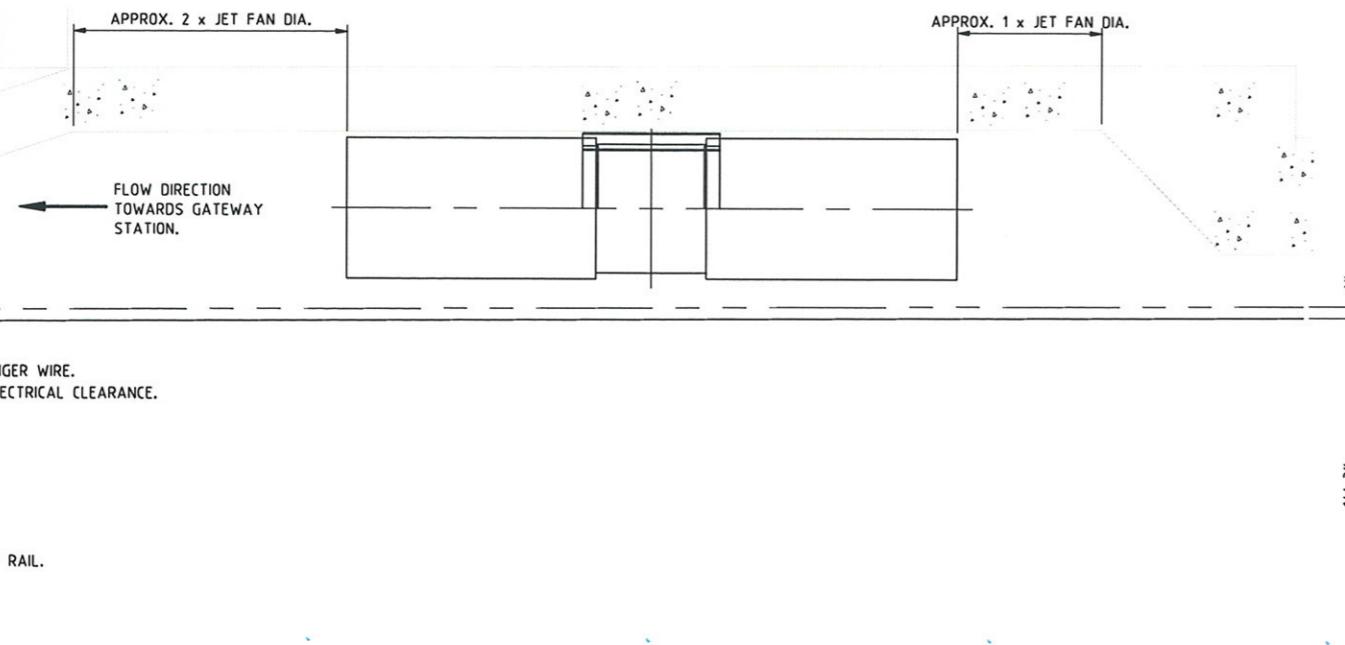
1. THE CONTRACTOR SHALL REFER TO SECTION 15889 "TUNNEL VENTILATION FANS", SECTION 15888 "TUNNEL VENTILATION NOISE ATTENUATORS" AND SECTION 15887 "TUNNEL VENTILATION AND BALANCING DAMPERS" OF THE CONTRACT DOCUMENTS FOR FURTHER DETAILS.
2. THE CONTRACTOR SHALL COORDINATE ALL BUILDERS WORK (PLENUM) OPENINGS PRIOR TO PROCUREMENT AND INSTALLATION OF ALL EQUIPMENT.
3. ALL DAMPER DIMENSIONS ARE CLEAR INTERNAL OPENINGS.
4. NUMBER OF DAMPER ACTUATORS ARE INDICATIVE ONLY.

<b>MAUNSELL   AECOM</b> <small>Maunsell Australia Pty Ltd A.B.N. 20 093 846 925</small> <i>Stacey</i> APPROVED <b>JUNE 27, 2008</b> <small>DATE</small>	<table border="1"> <tr><td>NO.</td><td>DATE</td><td>DESCRIPTION</td></tr> <tr><td></td><td></td><td>REVISIONS</td></tr> </table>	NO.	DATE	DESCRIPTION			REVISIONS	<small>THE PREPARATION OF THIS DOCUMENT HAS BEEN FINANCED IN PART THROUGH A GRANT FROM THE FEDERAL TRANSIT ADMINISTRATION, U.S. DEPARTMENT OF TRANSPORTATION, UNDER THE URBAN MASS TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE PORT AUTHORITY OF ALLEGHENY COUNTY, PENNSYLVANIA.</small>	<b>PROFESSIONAL ENGINEER OF QUEENSLAND</b> <b>CONRAD H.B. STACEY</b> <small>RPEQ 6128</small> <i>Stacey</i> <small>SIGNATURE PAP #002194</small>	<b>DMJM HARRIS   AECOM</b> <small>FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222</small>	<small>DESIGNED AP DRAWN KK CHECKED PG IN CHARGE CS DATE 06/27/08 SCALE AS NOTED</small>	<b>PORT AUTHORITY OF ALLEGHENY COUNTY</b> <small>PITTSBURGH PENNSYLVANIA</small> <small>NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM WIDE) NORTH SIDE STATION WESTERN END - TV FAN ROOM ELEVATIONS</small>
NO.	DATE	DESCRIPTION										
		REVISIONS										
<b>Port Authority</b> <small>Contract No. NSC-009 DWG. No. MC-231 SHT. 638</small>												



CROSS SECTION FOR JET FANS AT STA L6038+43

(EAST OF NORTH SIDE STATION)  
SCALE 1/4" - 1'-0"



TOP OF RAIL.

SECTION  
SCALE 1/4"-1"

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REGISTERED TRADE NAME: OMJM HARRIS | AECOM  
PROFESSIONAL CONTRACTOR SHALL REFER TO SECTION 15890 "TUNNEL VENTILATION"  
CONRAD H.B. STACEY  
RPEQ 5128  
Signature: Stacey  
PATP #002194

ENGINEER OF  
QUEENSLAND  
CONRAD H.B. STACEY  
RPEQ 5128  
Signature: Stacey  
PATP #002194

APPROVED

DATE

DESIGNED AP  
DRAWN K  
CHECKED PG  
IN CHARGE CS  
DATE 06/27/08  
SCALE AS NOTED

APPROVED

DATE

PORT AUTHORITY OF ALLEGHENY COUNTY  
PITTSBURGH PENNSYLVANIA

NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
NORTH SIDE STATION  
JET FAN SECTIONS - CUT AND COVER TUNNEL - SHEET 1 OF 2

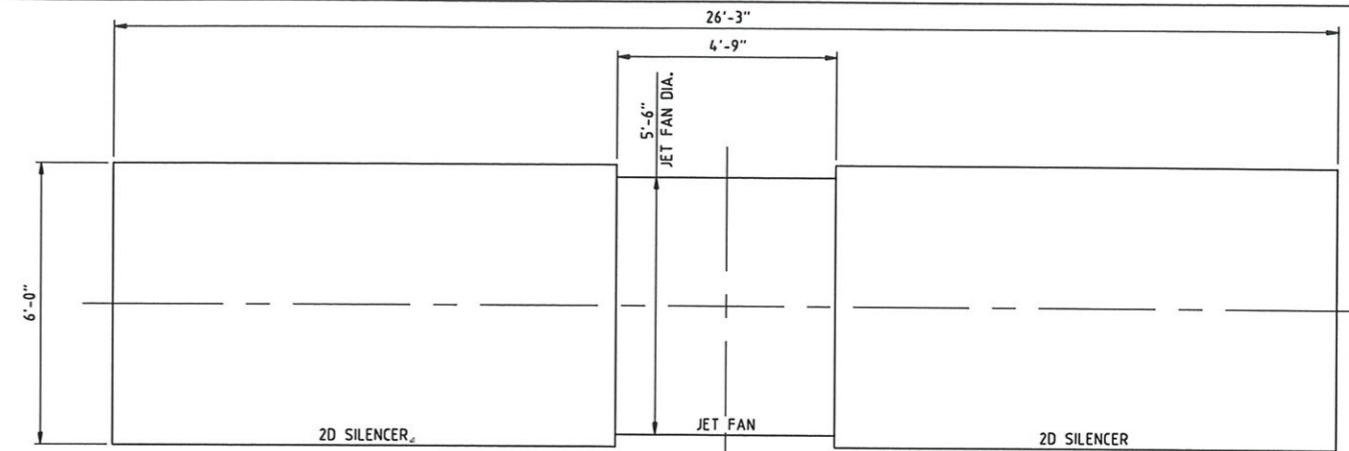
Port Authority	CONTRACT NO. NSC-009
	DWG. NO. MC-232
	SHT. 639

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Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

Approved  
Signature: Stacey

JUNE 27, 2008  
DATE

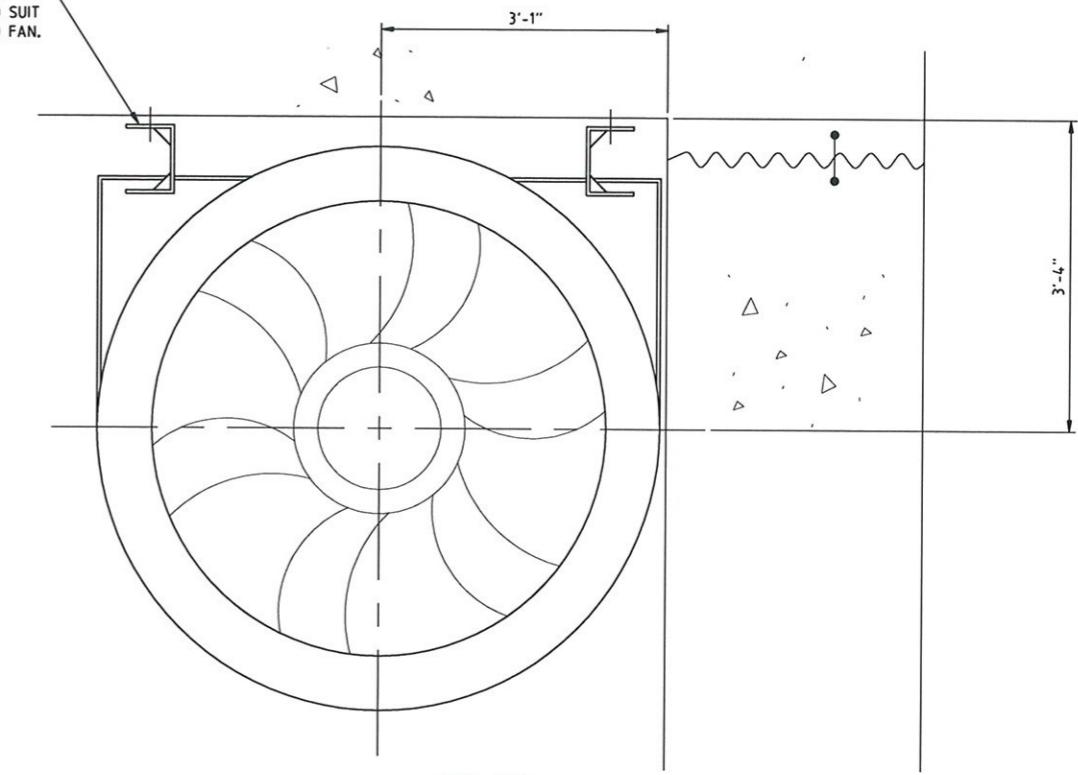
NO.	DATE	DESCRIPTION
REVISIONS		



TYPICAL 63" (1600) JET FAN ARRANGEMENT

SCALE 1/2" - 1'-0"

JET FAN BRACKET BY  
CONTRACTOR TO SUIT  
SELECTED FAN.

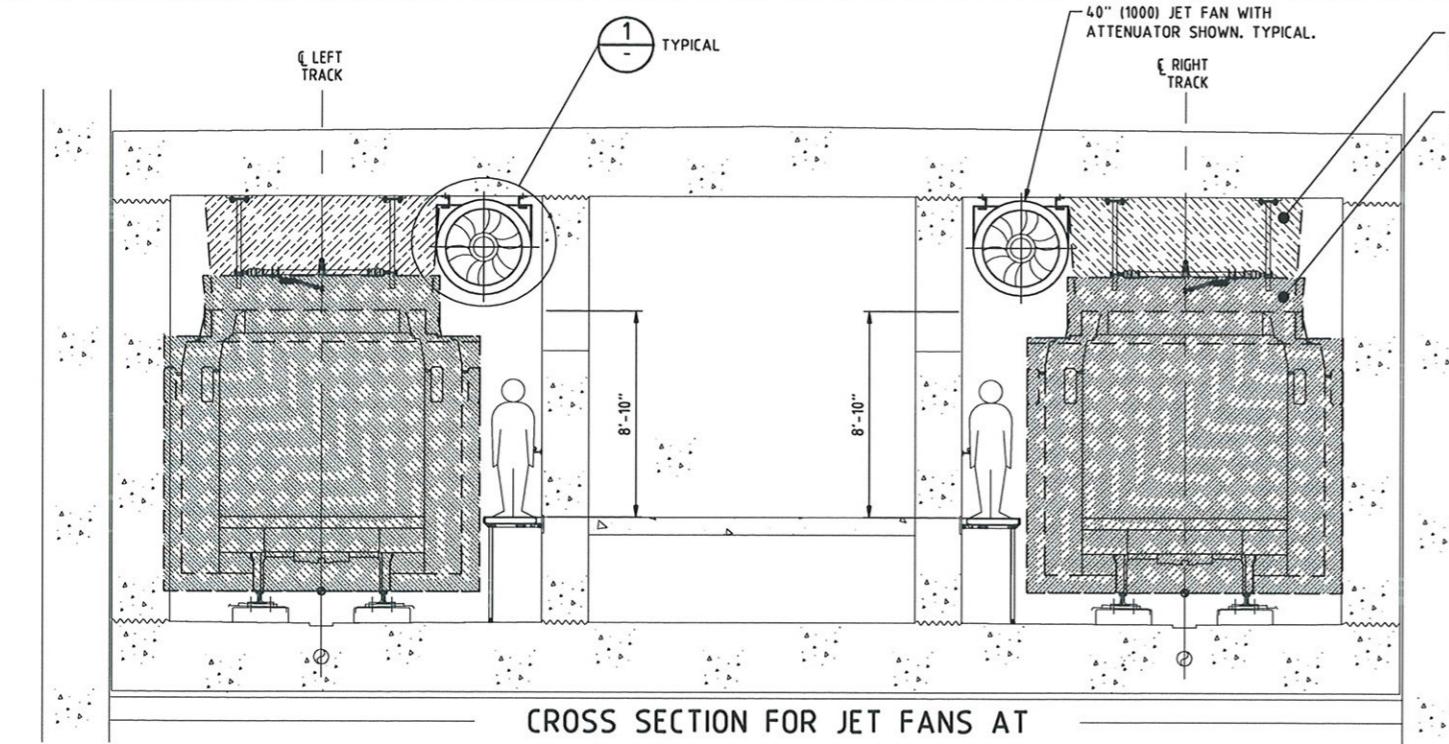


DETAIL  
SCALE 1"-1"  
1 2 SIMILAR  
OPPOSITE HAND

TYPICAL 63" (1600) JET FAN MOUNTING

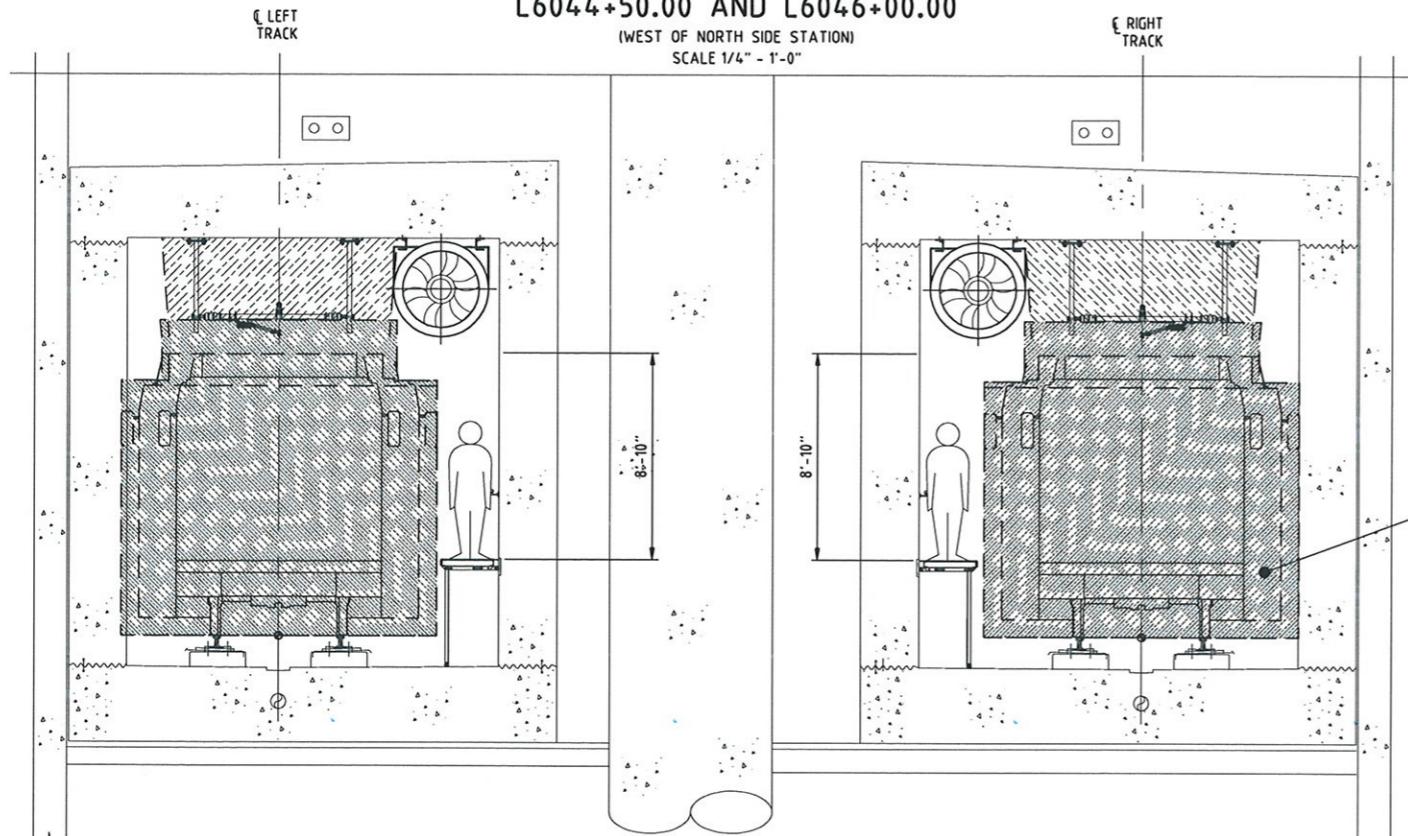
NOTE: DIMENSIONS AT LONGITUDINAL CENTERLINE OF FAN

- NOTES:
- ALL JET FAN DIMENSIONS NOMINALLY BASED ON FLAKWOODS 1600 SERIES JET FANS WITH 2D SILENCERS.
  - JET FAN MOUNTINGS ARE TYPICAL. CONTRACTOR SHALL SUPPLY MOUNTINGS SUITABLE FOR JET FAN SELECTED. VIBRATION ISOLATORS TO BE INCLUDED.
  - CONTRACTOR SHALL CONFIRM JET FAN INSTALLATIONS DO NOT ENCRAGE INTO THE PANTOGRAPH CLEARANCE ENVELOPE AND VEHICLE KINEMATIC ENVELOPE PRIOR TO PROCUREMENT AND INSTALLATION.
  - JET FAN NICHE CONSTRUCTED AS PART OF CONTRACT NSC-003. REFER TO DRAWINGS 03TN360, 03TN352, 03TN353 AND 03TN412.
6. JET FANS" OF THE CONTRACT DOCUMENTS FOR FURTHER DETAILS.  
6. THE CONTRACTOR SHALL CONFIRM THAT THE JET FAN INSTALLATIONS DO NOT INTERFERE WITH THE CATENARY. THE CONTRACTOR SHALL ENSURE THAT AT LEAST 6" CLEARANCE IS MAINTAINED BETWEEN THE MESSENGER WIRE AND ANY PART OF THE JET FAN ASSEMBLY.



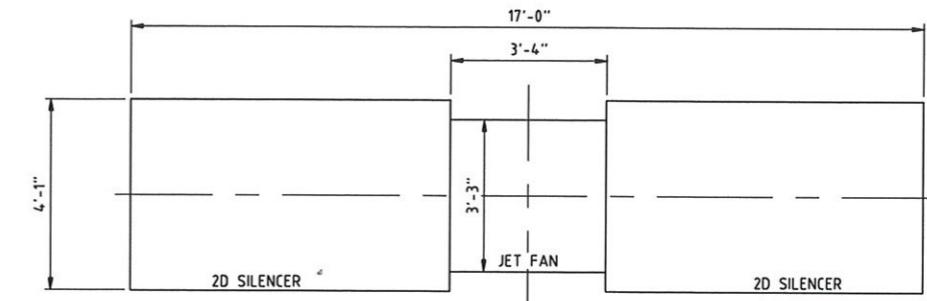
CROSS SECTION FOR JET FANS AT  
L6044+50.00 AND L6046+00.00

(WEST OF NORTH SIDE STATION)  
SCALE 1/4" - 1'-0"



CROSS SECTION FOR JET FANS AT  
L6047+50.00

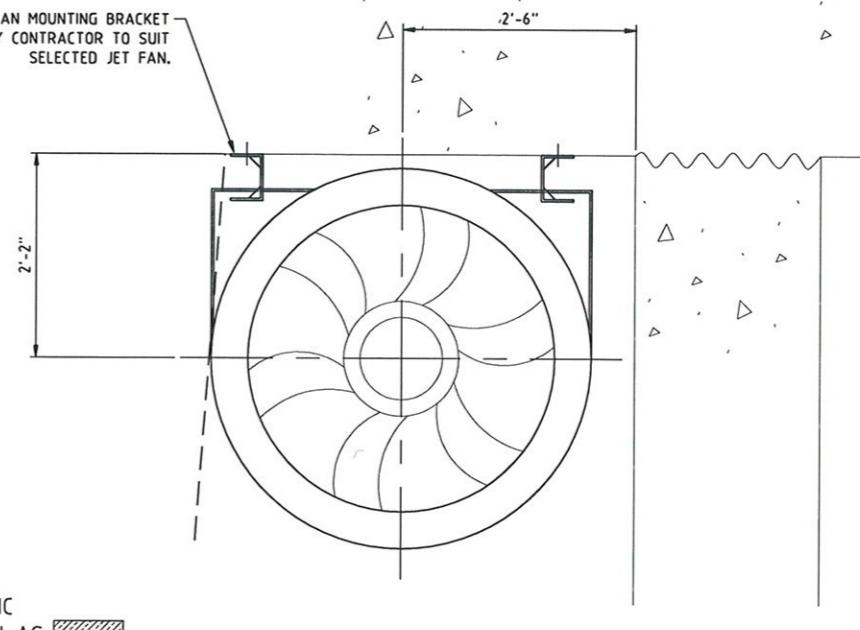
(WEST OF NORTH SIDE STATION)  
SCALE 1/4" - 1'-0"



TYPICAL 40" (1000mm) JET FAN ARRANGEMENT

SCALE 1/2" - 1'-0"

JET FAN MOUNTING BRACKET  
BY CONTRACTOR TO SUIT  
SELECTED JET FAN.



TYPICAL 40" (1000mm) JET FAN MOUNTING  
NOTE: DIMENSIONS AT LONGITUDINAL CENTERLINE OF FAN

NOTES:

1. ALL JET FAN DIMENSIONS NOMINALLY BASED ON FLAKWOODS 1000 SERIES JET FANS WITH 2D SILENCERS.
2. JET FAN MOUNTINGS ARE TYPICAL. CONTRACTOR SHALL SUPPLY MOUNTINGS SUITABLE FOR JET FAN SELECTED. VIBRATION ISOLATORS TO BE INCLUDED.
3. THE CONTRACTOR SHALL CONFIRM JET FAN INSTALLATIONS DO NOT ENCROACH INTO THE PANTOGRAPH CLEARANCE ENVELOPE OR THE VEHICLE KINEMATIC ENVELOPE PRIOR TO PROCUREMENT AND INSTALLATION.
4. THE CONTRACTOR SHALL REFER TO SECTION 15890 "TUNNEL VENTILATION JET FANS" OF THE CONTRACT DOCUMENTS FOR FURTHER DETAILS.
5. THE CONTRACTOR SHALL CONFIRM THAT THE JET FAN INSTALLATIONS DO NOT INTERFERE WITH THE CATENARY.

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TRANSPORTATION, UNDER THE URBAN MASS  
TRANSPORTATION ACT OF 1964, AS AMENDED, FOR THE  
PORT AUTHORITY OF ALLEGHENY COUNTY,  
PENNSYLVANIA.

REGISTERED  
PROFESSIONAL  
ENGINEER OF  
QUEENSLAND  
CONRAD H.B. STACEY  
RECO 5128  
SIGNATURE  
PATP #002104

DMJM HARRIS | AECOM  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

APPROVED DATE

DESIGNED AP  
DRAWN IK  
CHECKED PG  
IN CHARGE CS  
DATE 06/27/08  
SCALE AS NOTED

PORT AUTHORITY OF ALLEGHENY COUNTY  
PITTSBURGH PENNSYLVANIA  
NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
NORTH SIDE STATION  
JET FAN SECTIONS - CUT AND COVER TUNNEL - SHEET 2 OF 2  
Port Authority CONTRACT NO. NSC-009  
DWG. NO. MC-233 SHT. 640

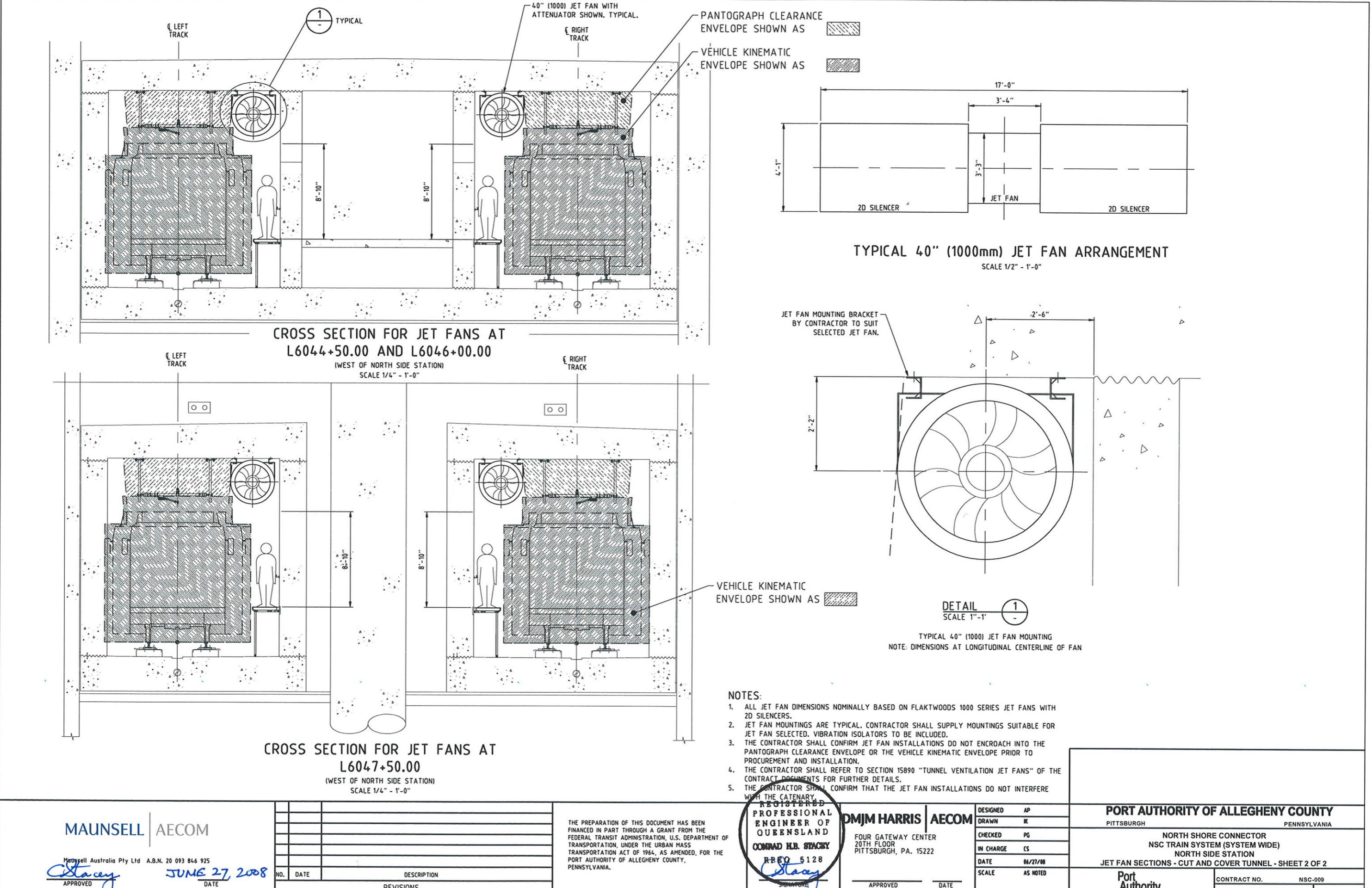
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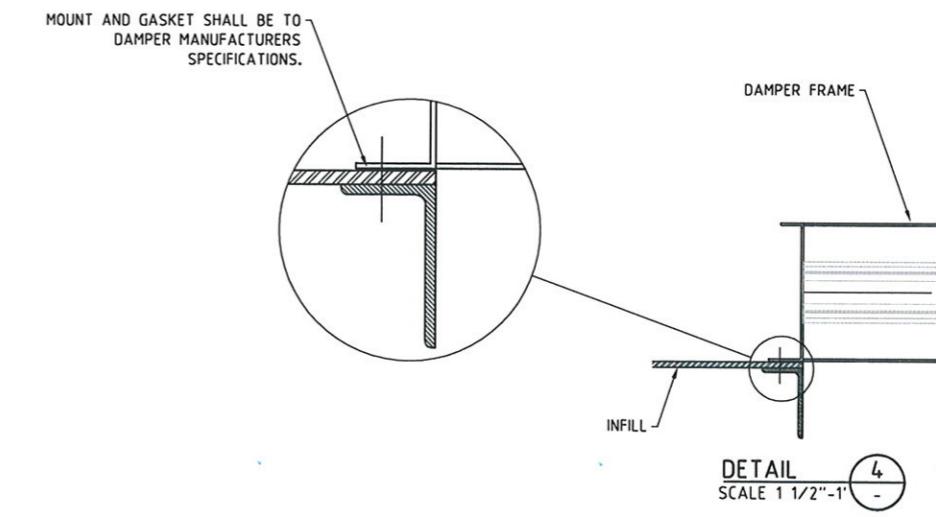
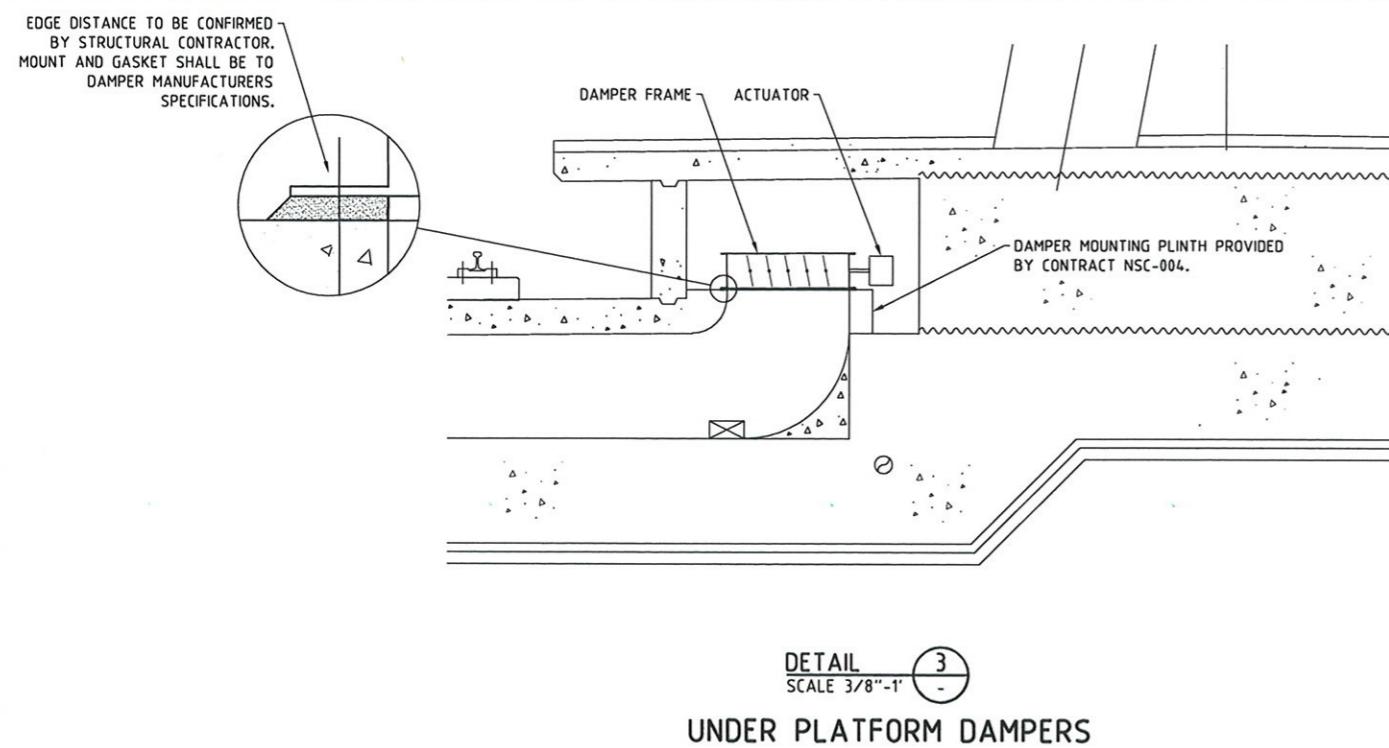
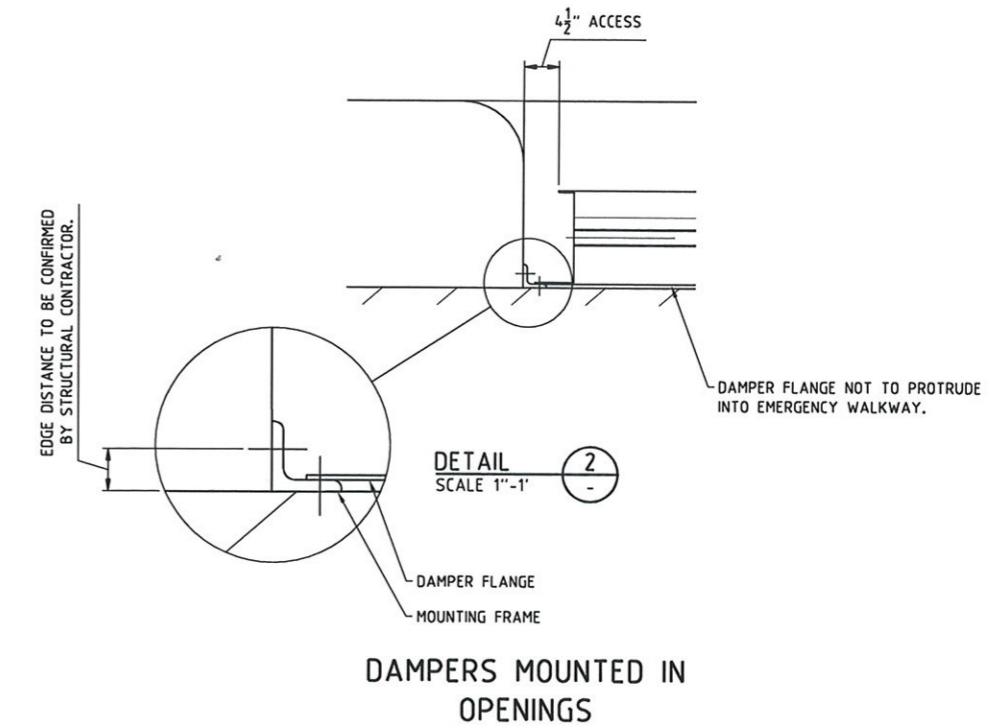
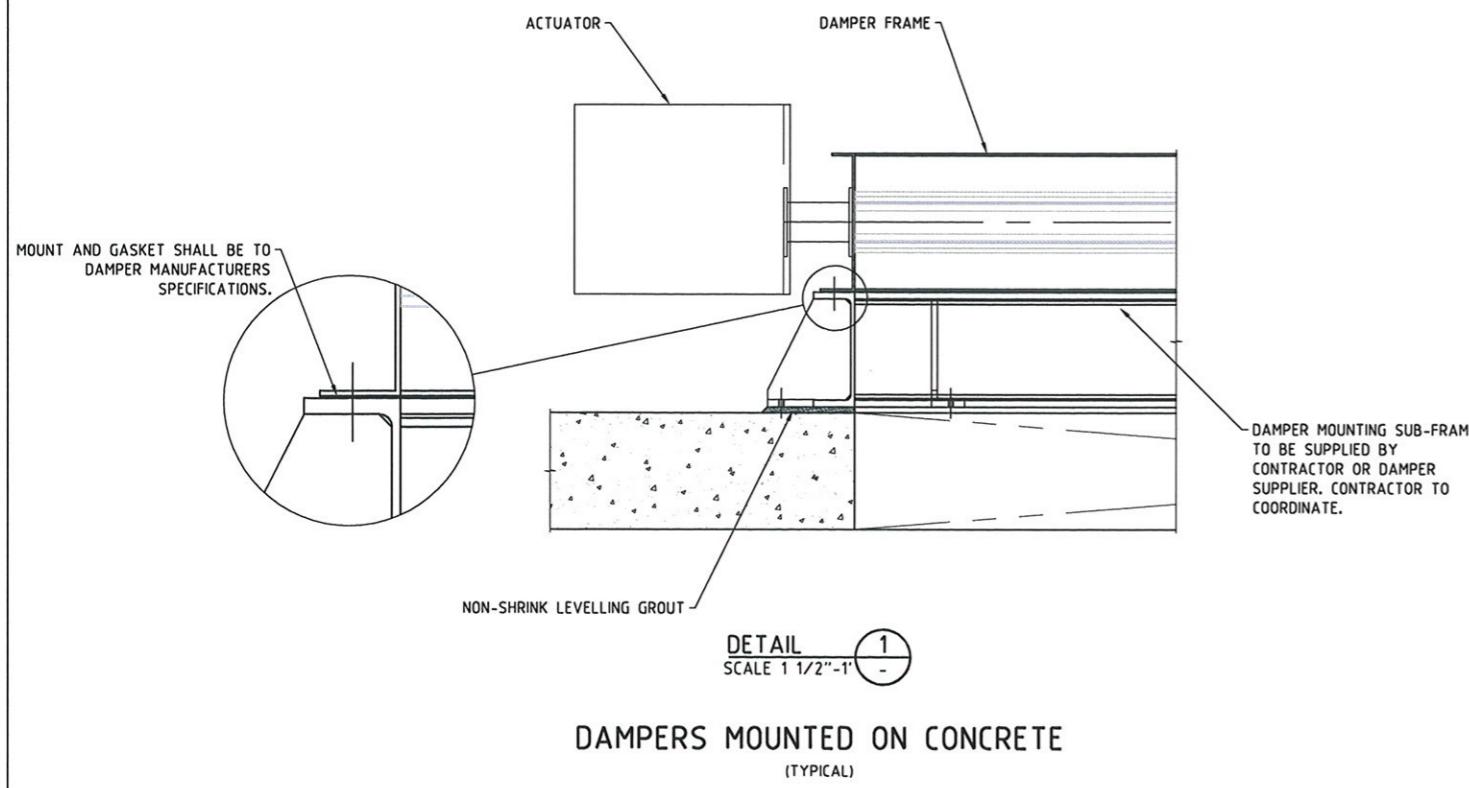
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*Stacey*  
APPROVED

JUNE 27, 2008  
DATE

NO.	DATE	DESCRIPTION
REVISIONS		





**NOTES:**

1. THE CONTRACTOR SHALL REFER TO SECTION 15887 "TUNNEL VENTILATION AND BALANCING DAMPERS" OF THE CONTRACT DOCUMENTS FOR FURTHER DETAILS.
2. THE CONTRACTOR SHALL CONFIRM ALL EQUIPMENT SIZES PRIOR TO PROCUREMENT AND INSTALLATION.
3. EDGE DISTANCES SHALL BE CONFIRMED WITH CONTRACTS NSC-004 AND NSC-006 PRIOR TO DAMPER INSTALLATION.
4. NUMBER OF DAMPER ACTUATORS ARE INDICATIVE ONLY.

PROFESSIONAL  
ENGINEER OF  
QUEENSLAND  
**CONRAD H.B. STACY**  
R.P.E.O. 5128  
SIGNATURE  
PATP #002194

**DMJM HARRIS | AECOM**  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

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IN CHARGE  
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06/27/08  
AS NOTED

PORT AUTHORITY OF ALLEGHENY COUNTY	
PITTSBURGH	PENNSYLVANIA
NORTH SHORE CONNECTOR	
NSC TRAIN SYSTEM (SYSTEM WIDE)	GATEWAY LINE
TYPICAL DAMPER MOUNTING DETAILS	
Port Authority	CONTRACT NO. NSC-009
	DWG. NO. MC-300
	SHT. 641

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TBA

TYPICAL PLATFORM LENGTH BALANCING DAMPERS  
NORTH SIDE STATION

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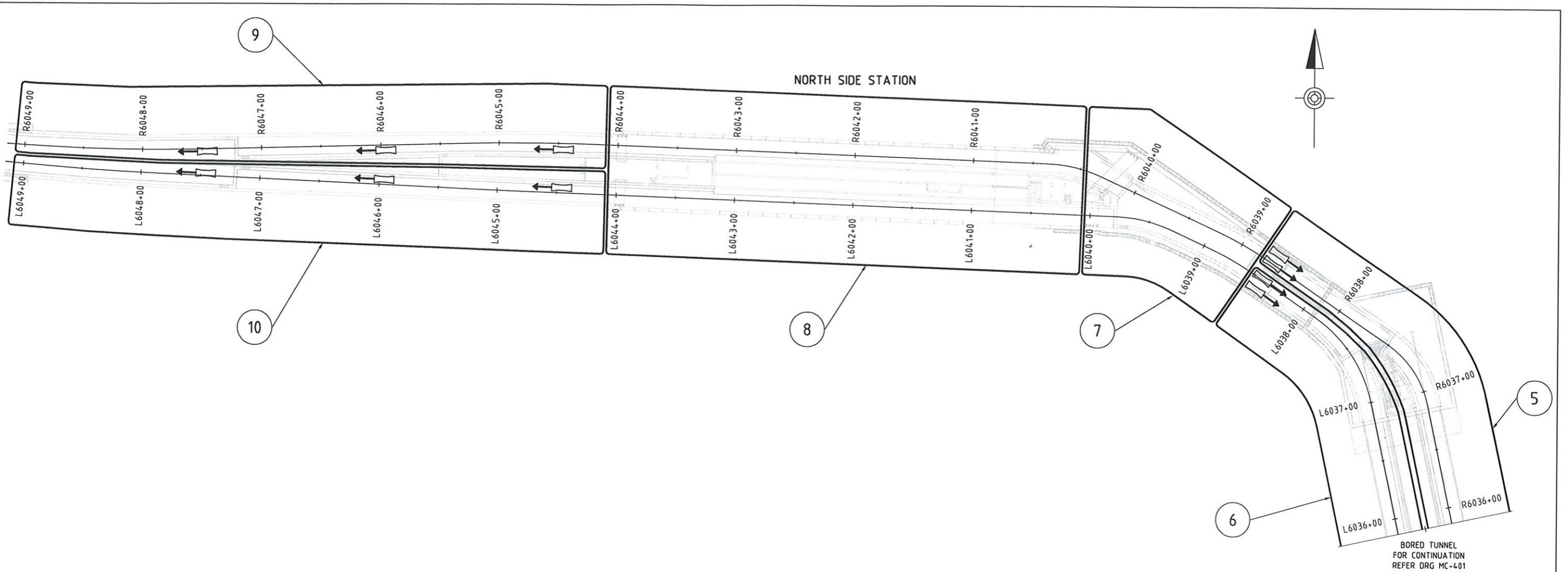
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ONAL  
R OF

**LAND  
STACEY** FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222

APPROVED \_\_\_\_\_ DATE \_\_\_\_\_





BORED TUNNEL  
FOR CONTINUATION  
REFER DRG MC-401

VENTILATION ZONE	DESCRIPTION
1	EXISTING FIRE ZONE H
2	EXISTING FIRE ZONE J
3	GATEWAY STATION EAST PLATFORM (RIGHT TRACK)
3a	GATEWAY STATION (RIGHT TRACK, NORTH EAST)
3b	GATEWAY STATION (RIGHT TRACK, SOUTH EAST)
4	GATEWAY STATION EAST PLATFORM (LEFT TRACK)
4a	GATEWAY STATION (LEFT TRACK, NORTH WEST)
4b	GATEWAY STATION (LEFT TRACK, SOUTH WEST)
5	BORED TUNNEL (RIGHT TRACK)
6	BORED TUNNEL (LEFT TRACK)
7	CROSS OVER
8	NORTH SIDE STATION PLATFORM
9	TUNNEL TO PORTAL (RIGHT TRACK)
10	TUNNEL TO PORTAL (LEFT TRACK)

NOTES:

1. ARROWS INDICATE THE FORWARD DIRECTION OF JET FANS.
2. REFER TO DRAWING MC-001 FOR GENERAL ARRANGEMENT OF MECHANICAL EQUIPMENT.
3. REFER TO DRAWING MC-108 FOR GATEWAY STATION MECHANICAL EQUIPMENT.
4. REFER TO DRAWINGS MC-201 AND MC-202 FOR NORTH SIDE STATION MECHANICAL EQUIPMENT.

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REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND CONNOR H.B. STACEY RPEQ 5128  
**DMJM HARRIS | AECOM**  
FOUR GATEWAY CENTER  
20TH FLOOR  
PITTSBURGH, PA. 15222  
APPROVED DATE  
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PATP #002194

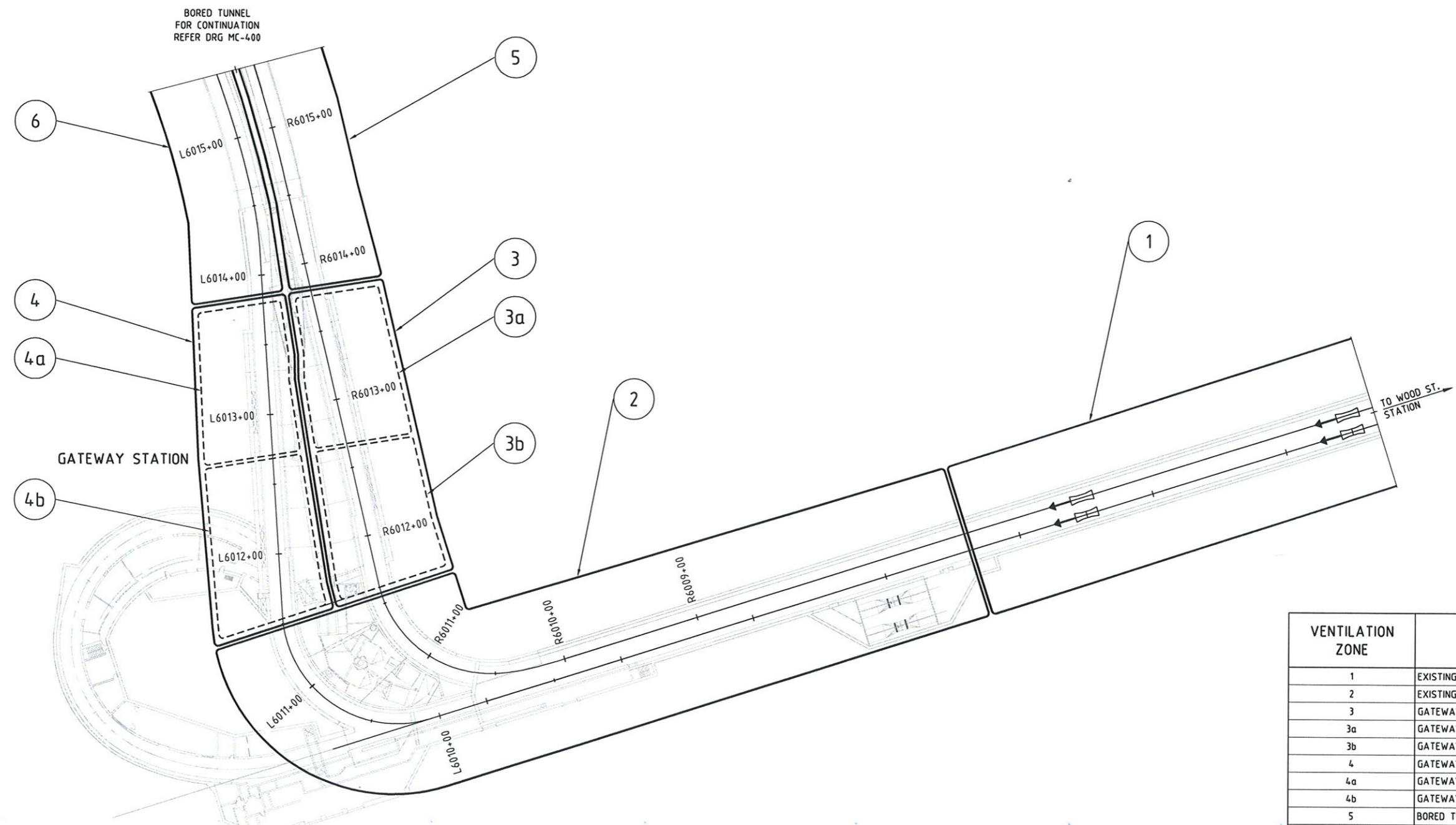
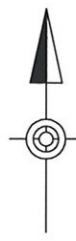
MAUNSELL | AECOM

Maunsell Australia Pty Ltd A.B.N. 20 093 846 925

*C Stacey*  
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NO.	DATE	DESCRIPTION	REVISIONS

**PORT AUTHORITY OF ALLEGHENY COUNTY**  
PITTSBURGH PENNSYLVANIA  
NORTH SHORE CONNECTOR  
NSC TRAIN SYSTEM (SYSTEM WIDE)  
TUNNEL VENTILATION SYSTEM  
VENTILATION ZONES - SHEET 1 OF 2  
Port Authority CONTRACT NO. NSC-009  
DWG. NO. MC-400 SHT. 644



VENTILATION ZONE	DESCRIPTION
1	EXISTING FIRE ZONE H
2	EXISTING FIRE ZONE J
3	GATEWAY STATION EAST PLATFORM (RIGHT TRACK)
3a	GATEWAY STATION (RIGHT TRACK, NORTH EAST)
3b	GATEWAY STATION (RIGHT TRACK, SOUTH EAST)
4	GATEWAY STATION EAST PLATFORM (LEFT TRACK)
4a	GATEWAY STATION (LEFT TRACK, NORTH WEST)
4b	GATEWAY STATION (LEFT TRACK, SOUTH WEST)
5	BORED TUNNEL (RIGHT TRACK)
6	BORED TUNNEL (LEFT TRACK)
7	CROSS OVER
8	NORTH SIDE STATION PLATFORM
9	TUNNEL TO PORTAL (RIGHT TRACK)
10	TUNNEL TO PORTAL (LEFT TRACK)

NOTES:

1. ARROWS INDICATE THE FORWARD DIRECTION OF JET FANS.
2. REFER TO DRAWING MC-001 FOR GENERAL ARRANGEMENT OF MECHANICAL EQUIPMENT.
3. REFER TO DRAWING MC-108 FOR GATEWAY STATION MECHANICAL EQUIPMENT.
4. REFER TO DRAWINGS MC-201 AND MC-202 FOR NORTH SIDE STATION MECHANICAL EQUIPMENT.

MAUNSELL   AECOM									
Maunsell Australia Pty Ltd A.B.N. 20 093 846 925 <i>C. Stacey</i> APPROVED		JUNE 27, 2008 DATE		NO. DATE DESCRIPTION REVISIONS		REGISTERED PROFESSIONAL ENGINEER OF QUEENSLAND CONRAD H.B. STACEY RPEQ #5128 PATP #002194		DESIGNED AP DRAWN IK CHECKED PG IN CHARGE CS DATE 06/27/08 SCALE NTS	
						DMJM HARRIS   AECOM FOUR GATEWAY CENTER 20TH FLOOR PITTSBURGH, PA. 15222 <i>C. Stacey</i>		PORT AUTHORITY OF ALLEGHENY COUNTY PITTSBURGH PENNSYLVANIA NORTH SHORE CONNECTOR NSC TRAIN SYSTEM (SYSTEM WIDE) TUNNEL VENTILATION SYSTEM VENTILATION ZONES - SHEET 2 OF 2	
						APPROVED DATE		Port Authority Contract No. NSC-009 DWG. NO. MC-401 SHT. 645	

VENTILATION MODE NUMBER	VENTILATION ZONES	OPERATION	LOCATION DESCRIPTION	NOTES	TUNNEL VENTILATION FANS				JET FANS			
					GATEWAY STATION	NORTH SIDE STATION	LIBERTY AVENUE TUNNEL		NORTH SIDE STATION TO TUNNEL PORTAL		TUNNEL EAST OF NORTH SIDE STATION	
1	3,4	NORMAL	GATEWAY STATION PLATFORM (SUMMER MODE)	FULL EXHAUST FROM HIGH LEVEL PLATFORM INLETS	GW-TVF-101 (GWS FAN ROOM)	GW-TVF-102 (GWS FAN ROOM) (NOTE 15,16)	-	-	-	-	-	-
2	3,4	NORMAL	GATEWAY STATION PLATFORM (FALL MODE)	REDUCED EXHAUST FROM HIGH LEVEL PLATFORM INLETS - VSDS USED TO SET FLOW (NOTE 21)	E	0	-	-	0	0	0	-
3	3,4	NORMAL	GATEWAY STATION PLATFORM (WINTER MODE)	NO EXHAUST	0	0	-	-	0	0	0	-
4	3,4	NORMAL	GATEWAY STATION PLATFORM (SPRING MODE)	REDUCED EXHAUST FROM HIGH LEVEL PLATFORM INLETS - VSDS USED TO SET FLOW (NOTE 21)	E	0	-	-	0	0	0	-
5	8	NORMAL	NORTH SIDE STATION PLATFORM (SUMMER MODE)	FULL EXHAUST FROM HIGH LEVEL PLATFORM INLETS	-	0	E	0	-	-	0	0
6	8	NORMAL	NORTH SIDE STATION PLATFORM (FALL MODE)	REDUCED EXHAUST FROM HIGH LEVEL PLATFORM INLETS - VSDS USED TO SET FLOW (NOTE 21)	-	0	E	0	-	-	0	0
7	8	NORMAL	NORTH SIDE STATION PLATFORM (WINTER MODE)	NO EXHAUST	-	0	0	0	-	-	0	0
8	8	NORMAL	NORTH SIDE STATION PLATFORM (SPRING MODE)	REDUCED EXHAUST FROM HIGH LEVEL PLATFORM INLETS - VSDS USED TO SET FLOW (NOTE 21)	-	0	0	E	0	-	0	0
9	1	CONGESTED	LIBERTY AVENUE TUNNEL (RT) - EXISTING ZONE H	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS GATEWAY STATION)	E	0	-	-	F	F	F	-
10	1	CONGESTED	LIBERTY AVENUE TUNNEL (LT) - EXISTING ZONE H	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS WOOD ST STATION)	S	0	-	-	R	R	R	-
11	2	CONGESTED	LIBERTY AVENUE TUNNEL - EXISTING ZONE J (LT AND RT)	VENTILATE TOWARDS WSS	S	0	-	-	R	R	R	-
12	5	CONGESTED	BORED TUNNEL (RT)	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS NSS)	S	0	E	E	-	-	-	-
13	6	CONGESTED	BORED TUNNEL (LT)	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS GWS)	E	0	S	0	-	-	-	-
14	7	CONGESTED	LAUNCH PIT AND CROSS-OVER	EXHAUST FROM LAUNCH PIT AND CROSS-OVER	-	-	E	E	-	-	-	-
15	9	CONGESTED	NORTH SIDE STATION TO PORTAL (RT)	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS PORTAL)	-	-	0	0	S	-	-	-
16	10	CONGESTED	NORTH SIDE STATION TO PORTAL (LT)	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS NSS)	-	-	0	0	E	-	-	-
17	1	EMERGENCY	LIBERTY AVENUE TUNNEL - EXISTING ZONE H	VENTILATE TOWARDS GATEWAY STATION. SMOKE EXHAUSTED BEFORE GATEWAY STATION	E	0	0	0	0	F	F	F
18	1	EMERGENCY	LIBERTY AVENUE TUNNEL - EXISTING ZONE H	VENTILATE TOWARDS WOOD ST STATION. SMOKE EXHAUSTED BEFORE WOOD ST FANS	S	0	0	0	0	R	R	R
19	2	EMERGENCY	LIBERTY AVENUE TUNNEL - EXISTING ZONE J (LT AND RT)	VENTILATE TOWARDS WSS. SMOKE EXHAUSTED BEFORE WSS	S	0	0	0	0	R	R	R
20	3	EMERGENCY	GATEWAY STATION EAST PLATFORM - INITIAL RESPONSE (RT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE WEST PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	E	0	0	0	0	0	0	0
21	4	EMERGENCY	GATEWAY STATION WEST PLATFORM - INITIAL RESPONSE (LT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE EAST PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	E	0	0	0	0	0	0	0
22	3a	EMERGENCY	GATEWAY STATION NE PLATFORM (RT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE NE PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	E	0	0	0	0	0	0	0
23	3b	EMERGENCY	GATEWAY STATION SE PLATFORM (RT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE SE PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	E	0	0	0	0	0	0	0
24	4a	EMERGENCY	GATEWAY STATION NW PLATFORM (LT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE NW PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	E	0	0	0	0	0	0	0
25	4b	EMERGENCY	GATEWAY STATION NE PLATFORM (LT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE SW PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	E	0	0	0	0	0	0	0
26	5	EMERGENCY	BORED TUNNEL (RT)	VENTILATE TOWARDS NSS BY GWS NOZZLE. SMOKE EXHAUSTED BEFORE NSS AT EASTERN TUNNEL DAMPERS	S	0	E	E	0	0	0	0
27	6	EMERGENCY	BORED TUNNEL (RT)	VENTILATE TOWARDS GWS BY JET FANS EAST OF NSS. SMOKE EXHAUSTED BEFORE GWS AT NORTHERN TUNNEL DAMPERS	E	0	S	0	0	0	0	0
28	6	EMERGENCY	BORED TUNNEL (LT)	VENTILATE TOWARDS GWS BY JET FANS EAST OF NSS. SMOKE EXHAUSTED BEFORE GWS AT NORTHERN TUNNEL DAMPERS.	E	0	S	0	0	0	0	0
29	6	EMERGENCY	BORED TUNNEL (LT)	VENTILATE TOWARDS NSS BY GWS NOZZLE. SMOKE EXHAUSTED BEFORE NSS AT EASTERN TUNNEL DAMPERS	S	0	E	E	0	0	0	0
30	7	EMERGENCY	LAUNCH PIT AND CROSS-OVER	EXHAUST SMOKE FROM LAUNCH PIT AND CROSS-OVER	-	-	E	E	0	0	-	-
31	8	EMERGENCY	NORTH SIDE STATION PLATFORM	SMOKE EXHAUSTED ALONG PLATFORM BY WESTERN FANS. EASTERN FANS ALSO USED IN EXHAUST.	0	0	E	E	E	0	0	0
32	9	EMERGENCY	NORTH SIDE STATION TO PORTAL (RT)	VENTILATE TOWARDS THE PORTAL BY JET FANS WEST OF NSS	0	0	0	0	S	0	0	0
33	9	EMERGENCY	NORTH SIDE STATION TO PORTAL (RT)	VENTILATE TOWARDS NSS BY JET FANS WEST OF NSS. SMOKE EXHAUSTED BEFORE NSS AT WESTERN TUNNEL DAMPERS.	0	0	0	0	E	0	0	0
34	10	EMERGENCY	NORTH SIDE STATION TO PORTAL (LT)	VENTILATE TOWARDS THE PORTAL BY JET FANS WEST OF NSS	0	0	0	0	S	0	0	0
35	10	EMERGENCY	NORTH SIDE STATION TO PORTAL (LT)	VENTILATE TOWARDS NSS BY JET FANS WEST OF NSS. SMOKE EXHAUSTED BEFORE NSS AT WESTERN TUNNEL DAMPERS.	0	0	0	0	E	0	0	0
36	1,2	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 1 AND 2	VENTILATE TOWARDS WSS. NOT USING ALL LIBERTY AV. TV FANS.	S	0	0	0	0	R	R	R
37	2,3	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 2 AND 3	VENTILATION MODE 19	S	0	0	0	0	R	R	R
38	2,4	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 2 AND 4	VENTILATION MODE 19	S	0	0	0	0	R	R	R
39	3a,3b	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 3A AND 3B	VENTILATION MODE 29	E	0	0	0	0	R	R	R
40	4a,b	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 4A AND 4B	VENTILATION MODE 21	E	0	0	0	0	R	R	R
41	3,5	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 3 AND 5	VENTILATION MODE 26	S	0	E	E	0	R	R	R
42	4,6	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 4 AND 6	VENTILATION MODE 29	S	0	E	E	0	R	R	R
43	5,7	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 5 AND 7	VENTILATION MODE 26	S	0	E	E	0	R	R	R
44	6,7	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 6 AND 7	VENTILATION MODE 29	S	0	E	E	0	R	R	R
45	7,8	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 7 AND 8	VENTILATION MODE 31	0	0	E	E	E	0	0	0
46	8,9	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 8 AND 9	VENTILATION MODE 32	0	0	0	0	S	0	0	0
47	8,10	EMERGENCY	LOCATION UNCERTAINTY BETWEEN ZONES 9 AND 10	VENTILATION MODE 34	0	0	0	0	S	0	0	0
48	SP	SP	SPARE	SPARE	0	0	0	0	0	0	0	0
49	SP	SP	SPARE	SPARE	0	0	0	0	0	0	0	0
50	SP	SP	SPARE	SPARE	0	0	0	0	0	0	0	0
51	SP	SP	SPARE	SPARE	0	0	0	0	0	0	0	0
52	SP	SP	SPARE	SPARE	0	0	0	0	0	0	0	0
53	SP	SP	SPARE	SPARE	0	0	0	0	0	0	0	0
54	SP	SP	SPARE	SPARE	0	0	0	0	0	0	0	0
55	SP	SP	SPARE	SPARE	0	0	0	0	0	0	0	0

1 THIS MODE TABLE SHALL BE READ IN CONJUNCTION WITH SECTION 15400, "TUNNEL SERVICES SCOPE OF WORK".

2 TUNNEL VENTILATION ZONES ARE SHOWN ON DRAWINGS MC-400 AND MC-401.

3 TUNNEL VENTILATION FAN OPERATIONS ARE GIVEN AS SUPPLY (S) OR EXHAUST (E). THE FLOW RATES ARE DETERMINED FROM THE DAMPERS.

4 DAMPER FLOW RATES ARE INDICATED IN CUBIC FEET PER SECOND. THE DIRECTION OF FLOW IS DETERMINED BY THE FAN OPERATION (SUPPLY OR EXHAUST).

5 TUNNEL VENTILATION FANS ARE INDICATED AS FAN TYPE AND FAN NUMBER. DRAWINGS MC-400 AND MC-401 FOR POSITIVE FLOW DIRECTION. JET FANS ARE SINGLE SPEED ONLY.

6 THIS MODE TABLE DOES NOT ACCOUNT FOR THE TRANSIENT STAGING OF THE TUNNEL VENTILATION.

7 A DASH (-) INDICATES THAT THE MODE DOES NOT AFFECT THIS DEVICE AND CURRENT POSITION (DAMPERS) OR OPERATION (JET FANS AND TUNNEL VENTILATION FANS) IS MAINTAINED.

8 A ZERO (0) INDICATES THAT THE MODE REQUIRES THIS DEVICE TO BE CLOSED (DAMPERS) OR OFF (JET FANS AND TUNNEL VENTILATION FANS).

9 AN ASTERISK (\*) INDICATES THAT THE DAMPER IS MODULATING AND THE SET POINTS ARE TO BE DETERMINED AT COMMISSIONING.

10 GW'S - GATEWAY STATION

11 NSS - NORTH SIDE STATION

12 WSS - WOOD STREET STATION

13 RT - RIGHT TRACK

14 LT - LEFT TRACK

15 THE CONTRACTOR SHALL PROGRAM THE CONTROL SYSTEM SUCH THAT A FAILURE EVENT IN EITHER FANS OR DAMPERS RESULTS IN THE STANDBY FANS OPERATING AUTOMATICALLY.

16 GW-TVF-102 IS A STANDBY FAN USED IN THE EVENT OF FAILURE OF GW-TVF-101.

17 NS-TVF-210 IS A STANDBY FAN USED IN THE EVENT OF FAILURE OF NS-TVF-208.

18 NS-TVF-205 IS A STANDBY FAN USED IN THE EVENT OF FAILURE OF EITHER NS-TVF-201 OR NS-TVF-203.

19 NS-TVF-207 IS A



VENTILATION MODE NUMBER	VENTILATION ZONES	OPERATION	LOCATION DESCRIPTION	NOTES	EXISTING VENTILATION FANS												EXISTING VENTILATION DAMPERS													
					MIDTOWN TUNNEL				WOOD STREET STATION				LIBERTY AVENUE				MIDTOWN TUNNEL				WOOD STREET STATION				LIBERTY AVENUE					
					VENTILATION METHODOLOGY																									
1	3,4	NORMAL	GATEWAY STATION PLATFORM (SUMMER MODE)	FULL EXHAUST FROM HIGH LEVEL PLATFORM INLETS	-	EM-3 (EXISTING TV FAN IN MIDTOWN TUNNEL)	-	EM-4 (EXISTING TV FAN IN MIDTOWN TUNNEL)	-	EM-5 (EXISTING TV FAN EAST OF WOOD ST STATION)	-	EM-6 (EXISTING TV FAN EAST OF WOOD ST STATION)	-	UPV-5 (EXISTING UPV FAN AT WOOD ST STATION)	-	UPV-6 (EXISTING UPV FAN AT WOOD ST STATION)	-	EM-7 (EXISTING TV FAN WEST OF WOOD ST STATION)	-	EM-8 (EXISTING TV FAN WEST OF WOOD ST STATION)	-	EM-9 (EXISTING TV FANS IN LIBERTY AVENUE TUNNEL)	-	EM-10 (EXISTING TV FANS IN LIBERTY AVENUE TUNNEL)	-					
2	3,4	NORMAL	GATEWAY STATION PLATFORM (FALL MODE)	REDUCED EXHAUST FROM HIGH LEVEL PLATFORM INLETS - VSDS USED TO SET FLOW (NOTE 21)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
3	3,4	NORMAL	GATEWAY STATION PLATFORM (WINTER MODE)	NO EXHAUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
4	3,4	NORMAL	GATEWAY STATION PLATFORM (SPRING MODE)	REDUCED EXHAUST FROM HIGH LEVEL PLATFORM INLETS - VSDS USED TO SET FLOW (NOTE 21)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
5	8	NORMAL	NORTH SIDE STATION PLATFORM (SUMMER MODE)	FULL EXHAUST FROM HIGH LEVEL PLATFORM INLETS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
6	8	NORMAL	NORTH SIDE STATION PLATFORM (FALL MODE)	REDUCED EXHAUST FROM HIGH LEVEL PLATFORM INLETS - VSDS USED TO SET FLOW (NOTE 21)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
7	8	NORMAL	NORTH SIDE STATION PLATFORM (WINTER MODE)	NO EXHAUST	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
8	8	NORMAL	NORTH SIDE STATION PLATFORM (SPRING MODE)	REDUCED EXHAUST FROM HIGH LEVEL PLATFORM INLETS - VSDS USED TO SET FLOW (NOTE 21)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
9	1	CONGESTED	LIBERTY AVENUE TUNNEL (RT) - EXISTING ZONE H	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS GATEWAY STATION)	S	S	S	S	0	0	S	S	E	E	0	135	0	135	0	135	0	0	0	135	0	150	0	150	0	
10	1	CONGESTED	LIBERTY AVENUE TUNNEL (LT) - EXISTING ZONE H	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS WOOD ST STATION)	0	0	E	E	E	E	E	E	S	S	0	0	0	0	150	0	150	0	25	25	150	0	150	0	135	0
11	2	CONGESTED	LIBERTY AVENUE TUNNEL - EXISTING ZONE J (LT AND RT)	VENTILATE TOWARDS NSS.	0	0	0	0	E	E	E	E	E	E	0	0	0	0	0	0	0	0	25	25	150	0	150	0	150	0
12	5	CONGESTED	BORED TUNNEL (RT)	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS NSS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
13	6	CONGESTED	BORED TUNNEL (LT)	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS GWS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
14	7	CONGESTED	LAUNCH PIT AND CROSS-OVER	EXHAUST FROM LAUNCH PIT AND CROSS-OVER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
15	9	CONGESTED	NORTH SIDE STATION TO PORTAL (RT)	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS PORTAL)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
16	10	CONGESTED	NORTH SIDE STATION TO PORTAL (LT)	VENTILATE IN DIRECTION OF TRAIN TRAVEL (TOWARDS NSS)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
17	1	EMERGENCY	LIBERTY AVENUE TUNNEL - EXISTING ZONE H	VENTILATE TOWARDS GATEWAY STATION SMOKE EXHAUSTED BEFORE GATEWAY STATION	S	S	S	S	0	0	S	S	E	E	0	135	0	135	0	135	0	0	0	135	0	150	0	150	0	
18	1	EMERGENCY	LIBERTY AVENUE TUNNEL - EXISTING ZONE H	VENTILATE TOWARDS WOOD ST STATION SMOKE EXHAUSTED BY WOOD ST FANS.	0	0	E	E	E	E	E	E	S	S	0	0	0	0	150	0	150	0	25	25	150	0	150	0	135	0
19	2	EMERGENCY	LIBERTY AVENUE TUNNEL - EXISTING ZONE J (LT AND RT)	VENTILATE TOWARDS NSS. SMOKE EXHAUSTED BEFORE NSS	0	1	0	0	0	0	E	E	E	E	E	0	0	0	0	0	0	0	25	25	150	0	150	0	150	0
20	3	EMERGENCY	GATEWAY STATION EAST PLATFORM - INITIAL RESPONSE (RT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE WEST PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
21	4	EMERGENCY	GATEWAY STATION WEST PLATFORM - INITIAL RESPONSE (LT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE EAST PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
22	3a, 3b	EMERGENCY	GATEWAY STATION NE PLATFORM (RT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE SE PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
23	3b	EMERGENCY	GATEWAY STATION SE PLATFORM (RT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE SE PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
24	4a	EMERGENCY	GATEWAY STATION NW PLATFORM (LT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE NW PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
25	4b	EMERGENCY	GATEWAY STATION NE PLATFORM (LT)	SMOKE EXHAUSTED AT HIGH LEVEL ALONG THE LENGTH OF THE SW PLATFORM. EXISTING LIBERTY AV. TV FANS IN EXHAUST.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
26	5	EMERGENCY	BORED TUNNEL (RT)	VENTILATE TOWARDS NSS BY GWS NOZZLE. SMOKE EXHAUSTED BEFORE NSS AT EASTERN TUNNEL DAMPERS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
27	5	EMERGENCY	BORED TUNNEL (RT)	VENTILATE TOWARDS GWS BY JET FANS EAST OF NSS. SMOKE EXHAUSTED BEFORE GWS AT NORTHERN TUNNEL DAMPERS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
28	6	EMERGENCY	BORED TUNNEL (LT)	VENTILATE TOWARDS GWS BY JET FANS EAST OF NSS. SMOKE EXHAUSTED BEFORE GWS AT NORTHERN TUNNEL DAMPERS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
29	6	EMERGENCY	BORED TUNNEL (LT)	VENTILATE TOWARDS NSS BY GWS NOZZLE. SMOKE EXHAUSTED BEFORE NSS AT EASTERN TUNNEL DAMPERS.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
30	7	EMERGENCY	LAUNCH PIT AND CROSS-OVER	EXHAUST SMOKE FROM LAUNCH PIT AND CROSS-OVER	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
31	8	EMERGENCY	NORTH SIDE STATION PLATFORM	SMOKE EXHAUSTED ALONG PLATFORM BY WESTERN F																										