

سلطة إقليم البترا التنهوي السياحي

PETRA DEVELOPMENT AND TOURISM REGION AUTHORITY



URBAN DEVELOPMENT AND TOURISM PLANNING FOR WADI MUSA DOWNTOWN



CONSOLIDATED
CONSULTANTS

Engineering
& Environment

Jafar Tukan
Architects

Consulting
Services

Mechanical Calculations

MAY.2014

HVAC CALCULATIONS

1. General Details:

Floor Area 97.0 m²
 Avg. Ceiling Height 5.0 m
 Building Weight 341.8 kg/m²

1.1. OA Ventilation Requirements:

Space Usage User-Defined
 OA Requirement 1 0.0 L/s
 OA Requirement 2 0.00 L/(s-m²)
 Space Usage Defaults ASHRAE Std 62.1-2004

2. Internals:

2.1. Overhead Lighting:

Fixture Type Free Hanging
 Wattage 30.00 W/m²
 Ballast Multiplier 1.20
 Schedule Sample Schedule1

2.2. Task Lighting:

Wattage 0.00 W/m²
 Schedule None

2.3. Electrical Equipment:

Wattage 400.0 Watts
 Schedule Sample Schedule1

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
SSW	60.0	0	0	0
NNE	60.0	20	0	0

3.1. Construction Types for Exposure SSW

Wall Type EX. WALL

3.2. Construction Types for Exposure NNE

Wall Type EX. WALL
 1st Window Type window111

4. Roofs, Skylights:

Exp.	Roof Gross Area (m ²)	Roof Slope (deg.)	Skylight Qty.
H	97.0	0	0

4.1. Construction Types for Exposure H

Roof Type wadi mousa

5. Infiltration:

Design Cooling 0.50 ACH
 Design Heating 1.00 ACH
 Energy Analysis 0.00 L/s

Infiltration occurs only when the fan is off.

6. Floors:

Type Floor Above Unconditioned Space
 Floor Area 97.0 m²
 Total Floor U-Value 1.600 W/(m²-°K)
 Unconditioned Space Max Temp. 32.0 °C
 Ambient at Space Max Temp. 40.0 °C
 Unconditioned Space Min Temp. 8.0 °C
 Ambient at Space Min Temp. 0.0 °C

7. Partitions:

7.1. 1st Partition Details:

Partition Type Wall Partition
 Area 40.0 m²
 U-Value 2.000 W/(m²-°K)
 Uncondit. Space Max Temp. 32.0 °C
 Ambient at Space Max Temp. 40.0 °C
 Uncondit. Space Min Temp. 8.0 °C
 Ambient at Space Min Temp. 0.0 °C

2.4. People:

Occupancy 30.0 People
 Activity Level Office Work
 Sensible 71.8 W/person
 Latent 60.1 W/person
 Schedule Sample Schedule1

2.5. Miscellaneous Loads:

Sensible 0 W
 Schedule Sample Schedule1
 Latent 0 W
 Schedule None

7.2. 2nd Partition Details:

(No partition data).

1. General Details:

Floor Area **44.3** m²
 Avg. Ceiling Height **5.0** m
 Building Weight **341.8** kg/m²

1.1. OA Ventilation Requirements:

Space Usage **User-Defined**
 OA Requirement 1 **0.0** L/s/person
 OA Requirement 2 **0.00** L/(s·m²)
 Space Usage Defaults **ASHRAE Std 62.1-2004**

2. Internals:**2.1. Overhead Lighting:**

Fixture Type **Free Hanging**
 Wattage **20.00** W/m²
 Ballast Multiplier **1.20**
 Schedule **Sample Schedule1**

2.2. Task Lighting:

Wattage **0.00** W/m²
 Schedule **None**

2.3. Electrical Equipment:

Wattage **150.0** Watts
 Schedule **Sample Schedule1**

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	19.0	12	0	0

3.1. Construction Types for Exposure WNW

Wall Type **EX. WALL**
 1st Window Type **window111**

4. Roofs, Skylights:

(No Roof or Skylight data).

5. Infiltration:

Design Cooling **0.50** ACH
 Design Heating **1.00** ACH
 Energy Analysis **0.00** L/s
 Infiltration occurs only when the fan is off.

6. Floors:

Type **Slab Floor Below Grade**
 Floor Area **44.3** m²
 Exposed Perimeter **3.8** m
 Total Floor U-Value **1.800** W/(m²·°K)
 Floor Depth **5.0** m
 Basement Wall U-Value **0.568** W/(m²·°K)
 Wall Insulation R-Value **0.00** (m²·°K)/W
 Wall Insulation Depth **0.0** m

7. Partitions:**7.1. 1st Partition Details:**

Partition Type **Wall Partition**
 Area **135.0** m²
 U-Value **2.000** W/(m²·°K)
 Uncondit. Space Max Temp **32.0** °C
 Ambient at Space Max Temp **40.0** °C
 Uncondit. Space Min Temp **8.0** °C
 Ambient at Space Min Temp **0.0** °C

2.4. People:

Occupancy **3.0** People
 Activity Level **Office Work**
 Sensible **71.8** W/person
 Latent **60.1** W/person
 Schedule **Sample Schedule1**

2.5. Miscellaneous Loads:

Sensible **0** W
 Schedule **None**
 Latent **0** W
 Schedule **None**

7.2. 2nd Partition Details:

Partition Type **Ceiling Partition**
 Area **44.3** m²
 U-Value **2.350** W/(m²·°K)
 Uncondit. Space Max Temp **32.0** °C
 Ambient at Space Max Temp **40.0** °C
 Uncondit. Space Min Temp **8.0** °C
 Ambient at Space Min Temp **0.0** °C

1. General Details:

Floor Area **52.2** m²
 Avg. Ceiling Height **5.0** m
 Building Weight **341.8** kg/m²

1.1. OA Ventilation Requirements:

Space Usage **User-Defined**
 OA Requirement 1 **0.0** L/s/person
 OA Requirement 2 **0.00** L/(s·m²)
 Space Usage Defaults **ASHRAE Std 62.1-2004**

2. Internals:**2.1. Overhead Lighting:**

Fixture Type **Free Hanging**
 Wattage **20.00** W/m²
 Ballast Multiplier **1.20**
 Schedule **Sample Schedule1**

2.2. Task Lighting:

Wattage **0.00** W/m²
 Schedule **None**

2.3. Electrical Equipment:

Wattage **150.0** Watts
 Schedule **Sample Schedule1**

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	19.0	12	0	0

3.1. Construction Types for Exposure WNW

Wall Type **EX. WALL**
 1st Window Type **window111**

4. Roofs, Skylights:

(No Roof or Skylight data).

5. Infiltration:

Design Cooling **0.50** ACH
 Design Heating **1.00** ACH
 Energy Analysis **0.00** L/s
 Infiltration occurs only when the fan is off.

6. Floors:

Type **Slab Floor Below Grade**
 Floor Area **52.2** m²
 Exposed Perimeter **3.8** m
 Total Floor U-Value **1.800** W/(m²·°K)
 Floor Depth **5.0** m
 Basement Wall U-Value **0.568** W/(m²·°K)
 Wall Insulation R-Value **0.00** (m²·°K)/W
 Wall Insulation Depth **0.0** m

7. Partitions:**7.1. 1st Partition Details:**

Partition Type **Wall Partition**
 Area **100.0** m²
 U-Value **2.000** W/(m²·°K)
 Uncondit. Space Max Temp **34.0** °C
 Ambient at Space Max Temp **40.0** °C
 Uncondit. Space Min Temp **8.0** °C
 Ambient at Space Min Temp **0.0** °C

2.4. People:

Occupancy **3.0** People
 Activity Level **Office Work**
 Sensible **71.8** W/person
 Latent **60.1** W/person
 Schedule **Sample Schedule1**

2.5. Miscellaneous Loads:

Sensible **0** W
 Schedule **None**
 Latent **0** W
 Schedule **None**

7.2. 2nd Partition Details:

Partition Type **Ceiling Partition**
 Area **52.2** m²
 U-Value **2.350** W/(m²·°K)
 Uncondit. Space Max Temp **34.0** °C
 Ambient at Space Max Temp **40.0** °C
 Uncondit. Space Min Temp **8.0** °C
 Ambient at Space Min Temp **0.0** °C

1. General Details:

Floor Area **16.9** m²
 Avg. Ceiling Height **5.0** m
 Building Weight **341.8** kg/m²

1.1. OA Ventilation Requirements:

Space Usage **User-Defined**
 OA Requirement 1 **0.0** L/s/person
 OA Requirement 2 **0.00** L/(s·m²)
 Space Usage Defaults **ASHRAE Std 62.1-2004**

2. Internals:**2.1. Overhead Lighting:**

Fixture Type **Free Hanging**
 Wattage **20.00** W/m²
 Ballast Multiplier **1.20**
 Schedule **Sample Schedule1**

2.2. Task Lighting:

Wattage **0.00** W/m²
 Schedule **None**

2.3. Electrical Equipment:

Wattage **150.0** Watts
 Schedule **Sample Schedule1**

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	22.0	10	0	0

3.1. Construction Types for Exposure WNW

Wall Type **EX. WALL**
 1st Window Type **window111**

4. Roofs, Skylights:

Exp.	Roof Gross Area (m ²)	Roof Slope (deg.)	Skylight Qty.
H	16.9	0	0

4.1. Construction Types for Exposure H

Roof Type **wadi mousa**

5. Infiltration:

Design Cooling **0.50** ACH
 Design Heating **1.00** ACH
 Energy Analysis **0.00** L/s
 Infiltration occurs only when the fan is off.

6. Floors:

Type **Slab Floor Below Grade**
 Floor Area **16.9** m²
 Exposed Perimeter **3.8** m
 Total Floor U-Value **1.800** W/(m²·°K)
 Floor Depth **5.0** m
 Basement Wall U-Value **0.568** W/(m²·°K)
 Wall Insulation R-Value **0.00** (m²·°K)/W
 Wall Insulation Depth **0.0** m

7. Partitions:**7.1. 1st Partition Details:**

Partition Type **Wall Partition**
 Area **40.0** m²
 U-Value **2.000** W/(m²·°K)
 Uncondit. Space Max Temp **34.0** °C
 Ambient at Space Max Temp **40.0** °C
 Uncondit. Space Min Temp **8.0** °C
 Ambient at Space Min Temp **0.0** °C

2.4. People:

Occupancy **2.0** People
 Activity Level **Office Work**
 Sensible **71.8** W/person
 Latent **60.1** W/person
 Schedule **Sample Schedule1**

2.5. Miscellaneous Loads:

Sensible **0** W
 Schedule **None**
 Latent **0** W
 Schedule **None**

7.2. 2nd Partition Details:

(No partition data).

1. General Details:

Floor Area 30.0 m²
 Avg. Ceiling Height 5.0 m
 Building Weight 341.8 kg/m²

1.1. OA Ventilation Requirements:

Space Usage User-Defined
 OA Requirement 1 0.0 L/s/person
 OA Requirement 2 0.00 L/(s·m²)
 Space Usage Defaults ASHRAE Std 62.1-2004

2. Internals:**2.1. Overhead Lighting:**

Fixture Type Free Hanging
 Wattage 20.00 W/m²
 Ballast Multiplier 1.20
 Schedule Sample Schedule1

2.2. Task Lighting:

Wattage 0.00 W/m²
 Schedule None

2.3. Electrical Equipment:

Wattage 150.0 Watts
 Schedule Sample Schedule1

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	39.0	12	0	0

3.1. Construction Types for Exposure WNW

Wall Type EX. WALL
 1st Window Type window111

4. Roofs, Skylights:

(No Roof or Skylight data).

5. Infiltration:

Design Cooling 0.50 ACH
 Design Heating 1.00 ACH
 Energy Analysis 0.00 L/s
 Infiltration occurs only when the fan is off.

6. Floors:

Type Slab Floor Below Grade
 Floor Area 30.0 m²
 Exposed Perimeter 3.8 m
 Total Floor U-Value 1.800 W/(m²·°K)
 Floor Depth 5.0 m
 Basement Wall U-Value 0.568 W/(m²·°K)
 Wall Insulation R-Value 0.00 (m²·°K)/W
 Wall Insulation Depth 0.0 m

7. Partitions:**7.1. 1st Partition Details:**

Partition Type Wall Partition
 Area 80.0 m²
 U-Value 2.000 W/(m²·°K)
 Uncondit. Space Max Temp 32.0 °C
 Ambient at Space Max Temp 40.0 °C
 Uncondit. Space Min Temp 8.0 °C
 Ambient at Space Min Temp 0.0 °C

2.4. People:

Occupancy 3.0 People
 Activity Level Office Work
 Sensible 71.8 W/person
 Latent 60.1 W/person
 Schedule Sample Schedule1

2.5. Miscellaneous Loads:

Sensible 0 W
 Schedule None
 Latent 0 W
 Schedule None

7.2. 2nd Partition Details:

Partition Type Ceiling Partition
 Area 30.0 m²
 U-Value 2.350 W/(m²·°K)
 Uncondit. Space Max Temp 32.0 °C
 Ambient at Space Max Temp 40.0 °C
 Uncondit. Space Min Temp 8.0 °C
 Ambient at Space Min Temp 0.0 °C

1. General Details:

Floor Area **47.0** m²
 Avg. Ceiling Height **5.0** m
 Building Weight **341.8** kg/m²

1.1. OA Ventilation Requirements:

Space Usage **User-Defined**
 OA Requirement 1 **0.0** L/s/person
 OA Requirement 2 **0.00** L/(s·m²)
 Space Usage Defaults **ASHRAE Std 62.1-2004**

2. Internals:**2.1. Overhead Lighting:**

Fixture Type **Free Hanging**
 Wattage **20.00** W/m²
 Ballast Multiplier **1.20**
 Schedule **Sample Schedule1**

2.2. Task Lighting:

Wattage **0.00** W/m²
 Schedule **None**

2.3. Electrical Equipment:

Wattage **150.0** Watts
 Schedule **Sample Schedule1**

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	19.0	12	0	0

3.1. Construction Types for Exposure WNW

Wall Type **EX. WALL**
 1st Window Type **window111**

4. Roofs, Skylights:

Exp.	Roof Gross Area (m ²)	Roof Slope (deg.)	Skylight Qty.
H	47.0	0	0

4.1. Construction Types for Exposure H

Roof Type **wadi mousa**

5. Infiltration:

Design Cooling **0.50** ACH
 Design Heating **1.00** ACH
 Energy Analysis **0.00** L/s
 Infiltration occurs only when the fan is off.

6. Floors:

Type **Floor Above Unconditioned Space**
 Floor Area **47.0** m²
 Total Floor U-Value **1.400** W/(m²·°K)
 Unconditioned Space Max Temp. **32.0** °C
 Ambient at Space Max Temp. **40.0** °C
 Unconditioned Space Min Temp. **8.0** °C
 Ambient at Space Min Temp. **0.0** °C

7. Partitions:**7.1. 1st Partition Details:**

Partition Type **Wall Partition**
 Area **120.0** m²
 U-Value **2.000** W/(m²·°K)
 Uncondit. Space Max Temp. **32.0** °C
 Ambient at Space Max Temp. **40.0** °C
 Uncondit. Space Min Temp. **8.0** °C
 Ambient at Space Min Temp. **0.0** °C

2.4. People:

Occupancy **3.0** People
 Activity Level **Office Work**
 Sensible **71.8** W/person
 Latent **60.1** W/person
 Schedule **Sample Schedule1**

2.5. Miscellaneous Loads:

Sensible **0** W
 Schedule **None**
 Latent **0** W
 Schedule **None**

7.2. 2nd Partition Details:

(No partition data).

1. General Details:

Floor Area **40.0** m²
 Avg. Ceiling Height **5.0** m
 Building Weight **341.8** kg/m²

1.1. OA Ventilation Requirements:

Space Usage **User-Defined**
 OA Requirement 1 **0.0** L/s/person
 OA Requirement 2 **0.00** L/(s·m²)
 Space Usage Defaults **ASHRAE Std 62.1-2004**

2. Internals:**2.1. Overhead Lighting:**

Fixture Type **Free Hanging**
 Wattage **20.00** W/m²
 Ballast Multiplier **1.20**
 Schedule **Sample Schedule1**

2.2. Task Lighting:

Wattage **0.00** W/m²
 Schedule **None**

2.3. Electrical Equipment:

Wattage **150.0** Watts
 Schedule **Sample Schedule1**

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	19.0	12	0	0

3.1. Construction Types for Exposure WNW

Wall Type **EX. WALL**
 1st Window Type **window111**

4. Roofs, Skylights:

Exp.	Roof Gross Area (m ²)	Roof Slope (deg.)	Skylight Qty.
H	40.0	0	0

4.1. Construction Types for Exposure H

Roof Type **wadi mousa**

5. Infiltration:

Design Cooling **0.50** ACH
 Design Heating **1.00** ACH
 Energy Analysis **0.00** L/s
 Infiltration occurs only when the fan is off.

6. Floors:

Type **Floor Above Unconditioned Space**
 Floor Area **40.0** m²
 Total Floor U-Value **1.400** W/(m²·°K)
 Unconditioned Space Max Temp. **32.0** °C
 Ambient at Space Max Temp. **40.0** °C
 Unconditioned Space Min Temp. **8.0** °C
 Ambient at Space Min Temp. **0.0** °C

7. Partitions:**7.1. 1st Partition Details:**

Partition Type **Wall Partition**
 Area **70.0** m²
 U-Value **2.000** W/(m²·°K)
 Uncondit. Space Max Temp. **32.0** °C
 Ambient at Space Max Temp. **40.0** °C
 Uncondit. Space Min Temp. **8.0** °C
 Ambient at Space Min Temp. **0.0** °C

2.4. People:

Occupancy **3.0** People
 Activity Level **Office Work**
 Sensible **71.8** W/person
 Latent **60.1** W/person
 Schedule **Sample Schedule1**

2.5. Miscellaneous Loads:

Sensible **0** W
 Schedule **None**
 Latent **0** W
 Schedule **None**

7.2. 2nd Partition Details:

(No partition data).

1. General Details:

Floor Area **28.0** m²
 Avg. Ceiling Height **5.0** m
 Building Weight **341.8** kg/m²

1.1. OA Ventilation Requirements:

Space Usage **User-Defined**
 OA Requirement 1 **0.0** L/s/person
 OA Requirement 2 **0.00** L/(s·m²)
 Space Usage Defaults **ASHRAE Std 62.1-2004**

2. Internals:**2.1. Overhead Lighting:**

Fixture Type **Free Hanging**
 Wattage **20.00** W/m²
 Ballast Multiplier **1.20**
 Schedule **Sample Schedule1**

2.2. Task Lighting:

Wattage **0.00** W/m²
 Schedule **None**

2.3. Electrical Equipment:

Wattage **150.0** Watts
 Schedule **Sample Schedule1**

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	19.0	12	0	0

3.1. Construction Types for Exposure WNW

Wall Type **EX. WALL**
 1st Window Type **window111**

4. Roofs, Skylights:

Exp.	Roof Gross Area (m ²)	Roof Slope (deg.)	Skylight Qty.
H	28.0	0	0

4.1. Construction Types for Exposure H

Roof Type **wadi mousa**

5. Infiltration:

Design Cooling **0.50** ACH
 Design Heating **1.00** ACH
 Energy Analysis **0.00** L/s
 Infiltration occurs only when the fan is off.

6. Floors:

Type **Floor Above Unconditioned Space**
 Floor Area **28.0** m²
 Total Floor U-Value **1.800** W/(m²·°K)
 Unconditioned Space Max Temp. **32.0** °C
 Ambient at Space Max Temp. **40.0** °C
 Unconditioned Space Min Temp. **8.0** °C
 Ambient at Space Min Temp. **0.0** °C

7. Partitions:**7.1. 1st Partition Details:**

Partition Type **Wall Partition**
 Area **50.0** m²
 U-Value **2.000** W/(m²·°K)
 Uncondit. Space Max Temp **32.0** °C
 Ambient at Space Max Temp **40.0** °C
 Uncondit. Space Min Temp **8.0** °C
 Ambient at Space Min Temp **0.0** °C

2.4. People:

Occupancy **2.0** People
 Activity Level **Office Work**
 Sensible **71.8** W/person
 Latent **60.1** W/person
 Schedule **Sample Schedule1**

2.5. Miscellaneous Loads:

Sensible **0** W
 Schedule **None**
 Latent **0** W
 Schedule **None**

7.2. 2nd Partition Details:

(No partition data).

1. General Details:

Floor Area **48.0** m²
 Avg. Ceiling Height **2.9** m
 Building Weight **341.8** kg/m²

1.1. OA Ventilation Requirements:

Space Usage **User-Defined**
 OA Requirement 1 **0.0** L/s/person
 OA Requirement 2 **0.00** L/(s·m²)
 Space Usage Defaults **ASHRAE Std 62.1-2004**

2. Internals:**2.1. Overhead Lighting:**

Fixture Type **Free Hanging**
 Wattage **20.00** W/m²
 Ballast Multiplier **1.20**
 Schedule **Sample Schedule1**

2.2. Task Lighting:

Wattage **0.00** W/m²
 Schedule **None**

2.3. Electrical Equipment:

Wattage **150.0** Watts
 Schedule **Sample Schedule1**

3. Walls, Windows, Doors:

Exp.	Wall Gross Area (m ²)	Window 1 Qty.	Window 2 Qty.	Door 1 Qty.
WNW	22.0	7	0	0

3.1. Construction Types for Exposure WNW

Wall Type **EX. WALL**
 1st Window Type **window111**

4. Roofs, Skylights:

Exp.	Roof Gross Area (m ²)	Roof Slope (deg.)	Skylight Qty.
H	48.0	0	0

4.1. Construction Types for Exposure H

Roof Type **wadi mousa**

5. Infiltration:

Design Cooling **0.50** ACH
 Design Heating **1.00** ACH
 Energy Analysis **0.00** L/s
 Infiltration occurs only when the fan is off.

6. Floors:

Type **Floor Above Unconditioned Space**
 Floor Area **48.0** m²
 Total Floor U-Value **1.400** W/(m²·°K)
 Unconditioned Space Max Temp. **32.0** °C
 Ambient at Space Max Temp. **40.0** °C
 Unconditioned Space Min Temp. **8.0** °C
 Ambient at Space Min Temp. **0.0** °C

7. Partitions:**7.1. 1st Partition Details:**

Partition Type **Wall Partition**
 Area **33.0** m²
 U-Value **2.000** W/(m²·°K)
 Uncondit. Space Max Temp. **32.0** °C
 Ambient at Space Max Temp. **40.0** °C
 Uncondit. Space Min Temp. **8.0** °C
 Ambient at Space Min Temp. **0.0** °C

2.4. People:

Occupancy **2.0** People
 Activity Level **Office Work**
 Sensible **71.8** W/person
 Latent **60.1** W/person
 Schedule **Sample Schedule1**

2.5. Miscellaneous Loads:

Sensible **0** W
 Schedule **None**
 Latent **0** W
 Schedule **None**

7.2. 2nd Partition Details:

(No partition data).

Air System Information

Air System Name WADI MOUSA
 Equipment Class TERM
 Air System Type SPLT-FC

Number of zones 9
 Floor Area 403.4 m²
 Location wadi mousa, Jordan

Sizing Calculation Information

Zone and Space Sizing Method:

Zone L/s Sum of space airflow rates
 Space L/s Individual peak space loads

Calculation Months Jan to Dec
 Sizing Data Calculated

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (kW)	Design Air Flow (L/s)	Minimum Air Flow (L/s)	Time of Peak Load	Maximum Heating Load (kW)	Zone Floor Area (m ²)	Zone L/(s-m ²)
SHOP1-11	6.8	650	650	Jul 1600	6.4	44.3	14.66
resturant	23.9	2269	2269	Jul 1500	13.0	97.0	23.39
shop12	7.4	699	699	Jul 1600	5.6	52.2	13.39
shop13-14	5.7	543	543	Jun 1600	3.0	16.9	32.14
shop15	7.3	692	692	Jul 1600	5.3	30.0	23.08
shop16-22	10.3	973	973	Jul 1500	7.2	47.0	20.70
shop23	8.8	831	831	Jul 1600	5.3	40.0	20.77
shop24	7.1	675	675	Jun 1600	4.2	28.0	24.10
shop26	8.9	847	847	Jun 1500	4.9	48.0	17.65

Terminal Unit Sizing Data - Cooling

Zone Name	Total Coil Load (kW)	Sens Coil Load (kW)	Coil Entering DB / WB (°C)	Coil Leaving DB / WB (°C)	Water Flow @ 5.6 °K (L/s)	Time of Peak Load
SHOP1-11	6.8	6.4	24.7 / 17.9	15.3 / 14.7	-	Jul 1600
resturant	24.0	23.2	24.7 / 17.7	15.0 / 14.4	-	Jul 1500
shop12	7.5	7.0	24.6 / 17.7	15.0 / 14.4	-	Jun 1600
shop13-14	5.7	5.6	24.6 / 17.4	14.8 / 14.1	-	Jul 1600
shop15	7.3	7.0	24.7 / 17.6	15.1 / 14.4	-	Jun 1600
shop16-22	10.1	9.7	24.8 / 17.9	15.3 / 14.7	-	Jul 1500
shop23	8.6	8.3	24.9 / 17.9	15.4 / 14.7	-	Jul 1500
shop24	7.1	6.9	24.7 / 17.7	15.1 / 14.4	-	Jun 1600
shop26	9.1	8.7	24.6 / 17.5	14.8 / 14.2	-	Jun 1500

Terminal Unit Sizing Data - Heating, Fan, Ventilation

Zone Name	Heating Coil Load (kW)	Heating Coil Ent/Lvg DB (°C)	Htg Coil Water Flow @11.1 °K (L/s)	Fan Design Airflow (L/s)	Fan Motor (BHP)	Fan Motor (kW)	OA Vent Design Airflow (L/s)
SHOP1-11	6.2	20.6 / 29.6	-	650	0.000	0.000	0
resturant	12.6	20.6 / 25.9	-	2269	0.000	0.000	0
shop12	5.4	20.5 / 27.8	-	699	0.000	0.000	0
shop13-14	2.9	20.5 / 25.6	-	543	0.000	0.000	0
shop15	5.2	20.7 / 27.9	-	692	0.000	0.000	0
shop16-22	7.1	20.7 / 27.7	-	973	0.000	0.000	0
shop23	5.3	20.8 / 26.9	-	831	0.000	0.000	0
shop24	4.1	20.8 / 26.6	-	675	0.000	0.000	0
shop26	4.8	20.7 / 26.1	-	847	0.000	0.000	0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
SHOP1-11							
shop1-11	1	6.8	Jul 1600	650	6.4	44.3	14.66
resturant							

Zone Sizing Summary for WADI MOUSA

Project Name: wadi mousa
Prepared by: cc

05/11/2014
12:11a

Zone Name / Space Name	Mult.	Cooling Sensible (kW)	Time of Load	Air Flow (L/s)	Heating Load (kW)	Floor Area (m ²)	Space L/(s-m ²)
resturant	1	23.9	Jul 1500	2269	13.0	97.0	23.39
shop12							
shop12	1	7.4	Jul 1600	699	5.6	52.2	13.39
shop13-14							
shop13-14	1	5.7	Jun 1600	543	3.0	16.9	32.14
shop15							
shop15	1	7.3	Jul 1600	692	5.3	30.0	23.08
shop16-22							
shop16-22	1	10.3	Jul 1500	973	7.2	47.0	20.70
shop23							
shop23	1	8.8	Jul 1600	831	5.3	40.0	20.77
shop24							
shop24	1	7.1	Jun 1600	675	4.2	28.0	24.10
shop26							
shop26	1	8.9	Jun 1500	847	4.9	48.0	17.65

WATER STORAGE TANK CALCULATIONS

WATER STORAGE CALCULATIONS:

STORAGE TANK CAPACITY:

24 shops:

Number of workers inside shop = 6 persons

Daily storage demand per person = 45 Liter/day

Total Daily Demand for shops = $6 \times 45 = 270$ Liter / day

Sex Days Storage Capacity = $0.27 \text{ m}^3 \times 6 = 0.1.62 \text{ m}^3$

Using 2 m³ storage tanks for each shop for one week.

PUBLIC AREA STORAGE TANK CAPACITY:

* Number of Daily workers inside building = 150 persons

Daily storage demand per person = 35 Liter/day

Total Daily demand for building = $150 \times 35 = 5250$ Liter/day

* Number of guests inside building = 200 persons

Daily storage demand per person = 5 Liter/day

Total Daily demand for building = $200 \times 5 = 1000$ Liter/day

Sex Days Storage Capacity = $6.251.6 \text{ m}^3 \times 6 = 37.5 \text{ m}^3$

Available storage tank for domestic Using 120 m³ storage tanks for public area .

RESTAURANT STORAGE TANK CAPACITY:

* Number of Daily workers inside Restaurant = 6 persons

Daily storage demand per person = 45 Liter/day

Total Daily demand for Restaurant = $6 \times 45 = 270$ Liter/day

* Number of guests inside Restaurant = 60 persons

Daily storage demand per person = 7 Liter/person/meal

Total Daily demand for Restaurant = $270 + 60 \times 7 \times 3 = 1665$ Liter/day

Six Days Storage Capacity = $1.665 \text{ m}^3 \times 6 = 9.9 \text{ m}^3$

Using 10 m³ storage tanks for Restaurant area for one week.

DRAINAGE CALCULATION:

The sprinkler system flow for parking, ordinary hazard group 1 sprinkler system considered the critical flow to size the submersible pumps.

The flow density= 8.15 L/min.m².

The remote area = 139 m²

Then; the maximum flow rate for one remote area= 14.2 L/s.

The number of sets =3

Each set compain of 2 pumps duty and one pump stand by

No. of starts per/hour 12 starts/hour is recommended

Flow of SUBP-01 = 2 L/s 4 No.

Flow of SUBP-02= 4 L/S 2 No.

PIT- 01

Effective volume of sump pit:

$$= 2 \times 2 \text{ L/s} \times 3600 / 12 = 1200 \text{ L} = 1.2 \text{ m}^3$$

- D) Sump pit volume = 1.6 x 1.6 x depth
Invert level of pipe entering sump pit = - 0.55 m
Sump pit depth = 1.2/ (1.6 x 1.6) +0.55=1.00m
Sump pit dimensions = 1.6x1.6x1.00m.

F) Pump head:

$$\text{Pump head} = (\text{Static head} + \text{Friction head}) \times 1.15 \text{ factor of safety} \\ = (8.0\text{m} + (20\text{m} \times 1.5 \times 400 \text{ Pa/m})) \times 1.15 = 11\text{m}.$$

PIT- 02

Effective volume of sump pit:

$$= 3 \times 2 \text{ L/s} \times 3600 / 12 = 1800 \text{ L} = 1.8 \text{ m}^3$$

- D) Sump pit volume = 2x2 x depth
Invert level of pipe entering sump pit = - 0.55 m
Sump pit depth = 1.8/ (2 x 2) +0.55=1.00m
Sump pit dimensions = 2X2X1m.

F) Pump head:

$$\text{Pump head} = (\text{Static head} + \text{Friction head}) \times 1.15 \text{ factor of safety} \\ = (8.0\text{m} + (90\text{m} \times 1.5 \times 400 \text{ Pa/m})) \times 1.15 = 15.5\text{m}$$

WADI MUSA DOWNTOWN Fire Sprinkler Reports

for

PETRA DEVELOPMENT REGION AUTHORITY

Prepared By:

MUATH YOUSEF
COSOLIDATED CONSULTANTS

5/6/2014

General Project Data Report

General Data

Project Title:	WADI MUSA DOWNTOWN	Project File Name:	wadi musa.fiw
Designed By:	MUATH YOUSEF	Date:	5/6/2014
Code Reference:		Approving Agency:	
Client Name:	PETRA DEVELOPMENT REGION AUTHORITY	Phone:	
Address:		City, State Zip Code:	
Company Name:	COSOLIDATED CONSULTANTS	Representative:	
Company Address:		City And State:	
Phone:			
Building Name:	PARKING	Building Owner:	
Contact at Building:		Phone at Building:	

Project Data

Description Of Hazard:	Ordinary 1	Sprinkler System Type:	Wet
Design Area Of Water Application:	1500 ft ²	Maximum Area Per Sprinkler:	130 ft ²
Default Sprinkler K-Factor:	5.60 K	Default Pipe Material:	SCHED 40 WET STEEL
Inside Hose Stream Allowance:	0.00 gpm	Outside Hose Stream Allowance:	0.00 gpm
In Rack Sprinkler Allowance:	0.00 gpm		
Sprinkler Specifications			
Make:		Model:	
Size:		Temperature Rating:	0 F

Water Supply Test Data

Source Of Information:		Date Of Test:	
Test Hydrant ID:			
Hydrant Elevation:	0 ft	Static Pressure:	0.00 psi
Test Flow Rate:	0.00 gpm	Test Residual Pressure:	0.00 psi
Calculated System Flow Rate:	423.63 gpm	Calculated Inflow Residual Pressure:	97.85 psi
Available Inflow Residual Pressure:	0 psi		

Calculation Project Data

Calculation Mode:	Demand	Minimum Desired Flow Density:	0.15 gpm/ft ²
HMD Minimum Residual Pressure:	0.70 psi	Number Of Inactive Pipes:	0
Number Of Active Nodes:	45	Number Of Inactive Sprinklers:	0
Number Of Active Pipes:	44		
Number Of Active Sprinklers:	16		

Fire Sprinkler Input Data

Node Input Data

Node No.	Node Description	Area Group	Sprinkler KFactor (K)	Pressure Estimate (psi)	Node Elevation (feet)	Non-Sprinkler Discharge (gpm)
1	Sprinkler					
2	Sprinkler					
3	No Discharge					
4	No Discharge					
5	Sprinkler					
6	No Discharge					
7	No Discharge					
8	Sprinkler					
9	Sprinkler					
10	No Discharge					
11	No Discharge					
12	Sprinkler					
13	Sprinkler					
14	Sprinkler					
15	No Discharge					
16	No Discharge					
17	Sprinkler					
18	Sprinkler					
19	No Discharge					
20	Sprinkler					
21	Sprinkler					
22	Sprinkler					
23	No Discharge					
24	No Discharge					
25	Sprinkler					
26	Sprinkler					
27	Sprinkler					
28	No Discharge					
29	No Discharge					

Fire Sprinkler Input Data

Node Input Data (cont'd)

Node No.	Node Description	Area Group	Sprinkler KFactor (K)	Pressure Estimate (psi)	Node Elevation (feet)	Non-Sprinkler Discharge (gpm)
30	No Discharge					
31	No Discharge					
32	No Discharge					
33	No Discharge					
34	No Discharge					
35	No Discharge					
36	No Discharge					
37	No Discharge					
38	No Discharge					
39	No Discharge					
40	No Discharge					
41	No Discharge					
42	No Discharge					
43	No Discharge					
44	No Discharge					
45	No Discharge		N/A	97.85	0.00	0.00

Fire Sprinkler Input Data

Pipe Input Data

Beg. Node	End. Node	Pipe Description	Nominal Diameter (inch)	Type Group	Fitting Data	Nominal Length (feet)	Fitting Length (feet)	Total Length (feet)	CFactor (gpm/inch-psi)
1	3	SCHED 40 WET STEEL	1.000	0	ET	5.91	7.00	12.91	120
3	4	SCHED 40 WET STEEL	1.000	0	T	1.31	5.00	6.31	120
2	3	SCHED 40 WET STEEL	1.000	0	ET	7.55	7.00	14.55	120
4	7	SCHED 40 WET STEEL	1.000	0	T	8.53	5.00	13.53	120
5	6	SCHED 40 WET STEEL	1.000	0	ET	5.91	7.00	12.91	120
6	7	SCHED 40 WET STEEL	1.000	0	T	1.31	5.00	6.31	120
8	6	SCHED 40 WET STEEL	1.000	0	ET	7.55	7.00	14.55	120
7	11	SCHED 40 WET STEEL	1.250	0	T	13.12	6.00	19.12	120
13	12	SCHED 40 WET STEEL	1.000	0	E	9.84	2.00	11.84	120
12	10	SCHED 40 WET STEEL	1.000	0	T	2.30	5.00	7.30	120
10	11	SCHED 40 WET STEEL	1.250	0	T	1.31	6.00	7.31	120
9	10	SCHED 40 WET STEEL	1.000	0	ET	7.22	7.00	14.22	120
11	16	SCHED 40 WET STEEL	2.000	0	T	13.12	10.00	23.12	120
14	15	SCHED 40 WET STEEL	1.000	0	ET	7.22	7.00	14.22	120
18	17	SCHED 40 WET STEEL	1.000	0	E	9.84	2.00	11.84	120
17	15	SCHED 40 WET STEEL	1.000	0	ET	2.30	7.00	9.30	120
15	16	SCHED 40 WET STEEL	1.250	0	T	1.31	6.00	7.31	120
16	19	SCHED 40 WET STEEL	2.500	0	T	9.51	12.00	21.51	120
20	21	SCHED 40 WET STEEL	1.000	0	E	8.20	2.00	10.20	120
21	22	SCHED 40 WET STEEL	1.000	0	T	6.56	5.00	11.56	120
22	23	SCHED 40 WET STEEL	1.250	0	ET	3.61	9.00	12.61	120
23	24	SCHED 40 WET STEEL	1.250	0	E	1.31	3.00	4.31	120
24	19	SCHED 40 WET STEEL	1.250	0	T	6.56	6.00	12.56	120
19	29	SCHED 40 WET STEEL	2.500	0	T	3.28	12.00	15.28	120
25	26	SCHED 40 WET STEEL	1.000	0	E	9.84	2.00	11.84	120
26	27	SCHED 40 WET STEEL	1.000	0	T	6.56	5.00	11.56	120
27	28	SCHED 40 WET STEEL	1.250	0	ET	3.61	9.00	12.61	120
28	29	SCHED 40 WET STEEL	1.250	0	T	1.31	6.00	7.31	120
29	30	SCHED 40 WET STEEL	3.000	0		18.37	0.00	18.37	120

Fire Sprinkler Input Data

Pipe Input Data (cont'd)

Beg. Node	End. Node	Pipe Description	Nominal Diameter (inch)	Type Group	Fitting Data	Nominal Length (feet)	Fitting Length (feet)	Total Length (feet)	CFactor (gpm/inch-psi)
30	31	SCHED 40 WET STEEL	3.000	0		47.90	0.00	47.90	120
31	32	SCHED 40 WET STEEL	4.000	0	E	24.61	10.00	34.61	120
32	33	SCHED 40 WET STEEL	4.000	0	E	147.64	10.00	157.64	120
33	34	SCHED 40 WET STEEL	4.000	0	E	24.61	10.00	34.61	120
34	35	SCHED 40 WET STEEL	4.000	0	E	45.93	10.00	55.93	120
35	36	SCHED 40 WET STEEL	4.000	0	E	5.91	10.00	15.91	120
36	37	SCHED 40 WET STEEL	4.000	0	B	2.62	12.00	14.63	120
37	38	SCHED 40 WET STEEL	4.000	0	E	2.62	10.00	12.63	120
38	39	SCHED 40 WET STEEL	4.000	0	E	17.72	10.00	27.72	120
39	40	SCHED 40 WET STEEL	4.000	0	E	30.18	10.00	40.18	120
40	41	SCHED 40 WET STEEL	4.000	0	E	10.83	10.00	20.83	120
41	42	SCHED 40 WET STEEL	4.000	0	E	31.82	10.00	41.82	120
42	43	SCHED 40 WET STEEL	4.000	0	E	1.64	10.00	11.64	120
43	44	SCHED 40 WET STEEL	4.000	0	2GC	9.19	26.00	35.19	120
44	45	SCHED 40 WET STEEL	8.000	0	BC	16.40	57.00	73.40	120

Fire Sprinkler Output Data

Overall Node Groupings Output Data

Pipe Segment		Pipe	Pipe	Sprinkler Flow	Non-Sprinkler Flow		Beg. Node	Imbalance
Beg. Node	End. Node	Type Group	Flow Rate (gpm)	At Beg. Node (gpm)	Out (+) (gpm)	In (-) (gpm)	Residual Pressure (psi)	Flow At Beg. Node (gpm)
1	3	0	-19.64	19.65	0.00	0.00	12.31	
2	3	0	-19.50	19.50	0.00	0.00	12.13	0.00122
3	1	0	19.64	0.00	0.00	0.00	13.65	-0.00107
3	2	0	19.50					
3	4	0	-39.14					
4	3	0	39.14	0.00	0.00	0.00	17.06	0.00000
4	7	0	-39.14					
5	6	0	-23.01	23.01	0.00	0.00	16.89	0.00125
6	5	0	23.01	0.00	0.00	0.00	18.78	-0.00001
6	7	0	-45.86					
6	8	0	22.84					
7	4	0	39.14	0.00	0.00	0.00	23.16	-0.00002
7	6	0	45.86					
7	11	0	-85.00					
8	6	0	-22.84	22.85	0.00	0.00	16.64	0.00118
9	10	0	-28.31	28.31	0.00	0.00	25.55	0.00249
10	9	0	28.31	0.00	0.00	0.00	28.79	0.00002
10	12	0	52.69					
10	11	0	-80.99					
11	7	0	85.00	0.00	0.00	0.00	32.69	-0.00003
11	10	0	80.99					
11	16	0	-165.99					
12	10	0	-52.69	27.07	0.00	0.00	23.37	0.00206
12	13	0	25.62					
13	12	0	-25.62	25.62	0.00	0.00	20.93	0.00135
14	15	0	-30.72	30.72	0.00	0.00	30.10	0.00320
15	14	0	30.72	0.00	0.00	0.00	33.91	-0.00002
15	17	0	55.73					
15	16	0	-86.45					
16	11	0	165.99	0.00	0.00	0.00	38.24	-0.00003
16	15	0	86.45					
16	19	0	-252.45					
17	15	0	-55.73	28.63	0.00	0.00	26.14	0.00237
17	18	0	27.11					
18	17	0	-27.11	27.11	0.00	0.00	23.43	0.00158
19	16	0	252.45	0.00	0.00	0.00	42.96	-0.00001
19	24	0	80.59					
19	29	0	-333.04					
20	21	0	-24.52	24.52	0.00	0.00	19.17	0.00098

Fire Sprinkler Output Data

Overall Node Groupings Output Data (cont'd)

Pipe Segment Beg. Node	End. Node	Pipe Type Group	Pipe Flow Rate (gpm)	Sprinkler Flow At Beg. Node (gpm)	Non-Sprinkler Flow Out (+) (gpm)	In (-) (gpm)	Beg. Node Residual Pressure (psi)	Imbalance Flow At Beg. Node (gpm)
21	20	0	24.52	25.72	0.00	0.00	21.10	0.00137
21	22	0	-50.24					
22	21	0	50.24	30.35	0.00	0.00	29.38	0.00342
22	23	0	-80.59					
23	22	0	80.59	0.00	0.00	0.00	34.78	-0.00001
23	24	0	-80.59					
24	19	0	-80.59	0.00	0.00	0.00	37.29	0.00000
24	23	0	80.59					
25	26	0	-27.47	27.47	0.00	0.00	24.07	0.00135
26	25	0	27.47	29.01	0.00	0.00	26.84	0.00212
26	27	0	-56.48					
27	26	0	56.48	34.12	0.00	0.00	37.12	0.00469
27	28	0	-90.59					
28	27	0	90.59	0.00	0.00	0.00	43.90	-0.00001
28	29	0	-90.59					
29	19	0	333.04	0.00	0.00	0.00	48.56	-0.00003
29	28	0	90.59					
29	30	0	-423.63					
30	29	0	423.63	0.00	0.00	0.00	52.21	0.00002
30	31	0	-423.63					
31	30	0	423.63	0.00	0.00	0.00	61.72	-0.00003
31	32	0	-423.63					
32	31	0	423.63	0.00	0.00	0.00	63.55	0.00003
32	33	0	-423.63					
33	32	0	423.63	0.00	0.00	0.00	71.88	-0.00003
33	34	0	-423.63					
34	33	0	423.63	0.00	0.00	0.00	73.71	0.00001
34	35	0	-423.63					
35	34	0	423.63	0.00	0.00	0.00	76.67	-0.00002
35	36	0	-423.63					
36	35	0	423.63	0.00	0.00	0.00	77.51	0.00000
36	37	0	-423.63					
37	36	0	423.63	0.00	0.00	0.00	78.29	0.00000
37	38	0	-423.63					
38	37	0	423.63	0.00	0.00	0.00	78.95	0.00001
38	39	0	-423.63					
39	38	0	423.63	0.00	0.00	0.00	80.42	0.00001
39	40	0	-423.63					

Fire Sprinkler Output Data

Overall Node Groupings Output Data (cont'd)

Pipe Segment Beg. Node	End. Node	Pipe Type Group	Pipe Flow Rate (gpm)	Sprinkler Flow At Beg. Node (gpm)	Non-Sprinkler Flow Out (+) (gpm)	In (-) (gpm)	Beg. Node Residual Pressure (psi)	Imbalance Flow At Beg. Node (gpm)
40	39	0	423.63	0.00	0.00	0.00	82.54	-0.00001
40	41	0	-423.63					
41	40	0	423.63	0.00	0.00	0.00	88.33	0.00001
41	42	0	-423.63					
42	41	0	423.63	0.00	0.00	0.00	90.54	-0.00002
42	43	0	-423.63					
43	42	0	423.63	0.00	0.00	0.00	95.85	0.00002
43	44	0	-423.63					
44	43	0	423.63	0.00	0.00	0.00	97.71	-0.00005
44	45	0	-423.63					
45	44	0	423.63	0.00	0.00	-423.63	97.85	

Fire Sprinkler Output Data

Overall Pipe Output Data

Beg. End. Node	Nodal KFactor (K)	Elevation (feet)	Spk/Hose Discharge (gpm)	Residual Pressure (psi)	Nom. Dia. Inside Dia. C-Value	Q (gpm) Velocity (fps)	F. L./ft (psi/ft) Fittings Type-Grp	Pipe-Len. Fit-Len. Tot-Len. (ft)	PF-(psi) PE-(psi) PV-(psi)
1	5.60	22.31	19.65	12.31	1.00	19.64	0.12594	5.91	1.625
3	0.00	22.97	0.00	13.65	1.049	7.29	ET	7.00	-0.284
SCHED 40 WET STEEL					120		0	12.91	0.358
2	5.60	22.31	19.50	12.13	1.00	19.50	0.12421	7.55	1.807
3	0.00	22.97	0.00	13.65	1.049	7.24	ET	7.00	-0.284
SCHED 40 WET STEEL					120		0	14.55	0.353
3	0.00	22.97	0.00	13.65	1.00	39.14	0.45096	1.31	2.846
4	0.00	21.65	0.00	17.06	1.049	14.53	T	5.00	0.568
SCHED 40 WET STEEL					120		0	6.31	1.421
5	5.60	22.31	23.01	16.89	1.00	23.01	0.16876	5.91	2.178
6	0.00	22.97	0.00	18.78	1.049	8.54	ET	7.00	-0.284
SCHED 40 WET STEEL					120		0	12.91	0.491
8	5.60	22.31	22.85	16.64	1.00	22.84	0.16650	7.55	2.422
6	0.00	22.97	0.00	18.78	1.049	8.48	ET	7.00	-0.284
SCHED 40 WET STEEL					120		0	14.55	0.484
4	0.00	21.65	0.00	17.06	1.00	39.14	0.45096	8.53	6.101
7	0.00	21.65	0.00	23.16	1.049	14.53	T	5.00	0.000
SCHED 40 WET STEEL					120		0	13.53	1.421
6	0.00	22.97	0.00	18.78	1.00	45.86	0.60436	1.31	3.815
7	0.00	21.65	0.00	23.16	1.049	17.02	T	5.00	0.568
SCHED 40 WET STEEL					120		0	6.31	1.950
9	5.60	22.31	28.31	25.55	1.00	28.31	0.24753	7.22	3.519
10	0.00	22.97	0.00	28.79	1.049	10.51	ET	7.00	-0.284
SCHED 40 WET STEEL					120		0	14.22	0.743
12	5.60	22.31	27.07	23.37	1.00	52.69	0.78144	2.30	5.702
10	0.00	22.97	0.00	28.79	1.049	19.56	T	5.00	-0.284
SCHED 40 WET STEEL					120		0	7.30	2.575
7	0.00	21.65	0.00	23.16	1.25	85.00	0.49790	13.12	9.521
11	0.00	21.65	0.00	32.69	1.380	18.23	T	6.00	0.000
SCHED 40 WET STEEL					120		0	19.12	2.237
10	0.00	22.97	0.00	28.79	1.25	80.99	0.45535	1.31	3.330
11	0.00	21.65	0.00	32.69	1.380	17.37	T	6.00	0.568
SCHED 40 WET STEEL					120		0	7.31	2.031
13	5.60	22.31	25.62	20.93	1.00	25.62	0.20584	9.84	2.438
12	5.60	22.31	27.07	23.37	1.049	9.51	E	2.00	0.000
SCHED 40 WET STEEL					120		0	11.84	0.609
14	5.60	22.31	30.72	30.10	1.00	30.72	0.28803	7.22	4.095
15	0.00	22.97	0.00	33.91	1.049	11.40	ET	7.00	-0.284
SCHED 40 WET STEEL					120		0	14.22	0.875
17	5.60	22.31	28.63	26.14	1.00	55.73	0.86700	2.30	8.060
15	0.00	22.97	0.00	33.91	1.049	20.69	ET	7.00	-0.284
SCHED 40 WET STEEL					120		0	9.30	2.881
11	0.00	21.65	0.00	32.69	2.00	165.99	0.24012	13.12	5.552

Fire Sprinkler Output Data

Overall Pipe Output Data (cont'd)

Beg. End. Node	Nodal KFactor (K)	Elevation (feet)	Spk/Hose Discharge (gpm)	Residual Pressure (psi)	Nom. Dia. Inside Dia. C-Value	Q (gpm) Velocity (fps)	F. L./ft (psi/ft) Fittings Type-Grp	Pipe-Len. Fit-Len. Tot-Len. (ft)	PF-(psi) PE-(psi) PV-(psi)
16	0.00	21.65	0.00	38.24	2.067	15.87	T	10.00	0.000
	SCHED 40 WET STEEL				120		0	23.12	1.695
15	0.00	22.97	0.00	33.91	1.25	86.45	0.51376	1.31	3.757
16	0.00	21.65	0.00	38.24	1.380	18.54	T	6.00	0.568
	SCHED 40 WET STEEL				120		0	7.31	2.314
18	5.60	22.31	27.11	23.43	1.00	27.11	0.22847	9.84	2.706
17	5.60	22.31	28.63	26.14	1.049	10.06	E	2.00	0.000
	SCHED 40 WET STEEL				120		0	11.84	0.681
16	0.00	21.65	0.00	38.24	2.50	252.45	0.21950	9.51	4.722
19	0.00	21.65	0.00	42.96	2.469	16.92	T	12.00	0.000
	SCHED 40 WET STEEL				120		0	21.51	1.926
24	0.00	21.65	0.00	37.29	1.25	80.59	0.45112	6.56	5.667
19	0.00	21.65	0.00	42.96	1.380	17.29	T	6.00	0.000
	SCHED 40 WET STEEL				120		0	12.56	2.011
20	5.60	22.31	24.52	19.17	1.00	24.52	0.18973	8.20	1.936
21	5.60	22.31	25.72	21.10	1.049	9.10	E	2.00	0.000
	SCHED 40 WET STEEL				120		0	10.20	0.557
21	5.60	22.31	25.72	21.10	1.00	50.24	0.71555	6.56	8.273
22	5.60	22.31	30.35	29.38	1.049	18.65	T	5.00	0.000
	SCHED 40 WET STEEL				120		0	11.56	2.341
22	5.60	22.31	30.35	29.38	1.25	80.59	0.45112	3.61	5.688
23	0.00	22.97	0.00	34.78	1.380	17.29	ET	9.00	-0.284
	SCHED 40 WET STEEL				120		0	12.61	2.011
23	0.00	22.97	0.00	34.78	1.25	80.59	0.45112	1.31	1.945
24	0.00	21.65	0.00	37.29	1.380	17.29	E	3.00	0.568
	SCHED 40 WET STEEL				120		0	4.31	2.011
25	5.60	22.31	27.47	24.07	1.00	27.47	0.23421	9.84	2.774
26	5.60	22.31	29.01	26.84	1.049	10.20	E	2.00	0.000
	SCHED 40 WET STEEL				120		0	11.84	0.700
26	5.60	22.31	29.01	26.84	1.00	56.48	0.88869	6.56	10.275
27	5.60	22.31	34.12	37.12	1.049	20.97	T	5.00	0.000
	SCHED 40 WET STEEL				120		0	11.56	2.959
27	5.60	22.31	34.12	37.12	1.25	90.59	0.56020	3.61	7.064
28	0.00	22.97	0.00	43.90	1.380	19.43	ET	9.00	-0.284
	SCHED 40 WET STEEL				120		0	12.61	2.541
19	0.00	21.65	0.00	42.96	2.50	333.04	0.36646	3.28	5.600
29	0.00	21.65	0.00	48.56	2.469	22.32	T	12.00	0.000
	SCHED 40 WET STEEL				120		0	15.28	3.352
28	0.00	22.97	0.00	43.90	1.25	90.59	0.56020	1.31	4.096
29	0.00	21.65	0.00	48.56	1.380	19.43	T	6.00	0.568
	SCHED 40 WET STEEL				120		0	7.31	2.541
29	0.00	21.65	0.00	48.56	3.00	423.63	0.19859	18.37	3.649
30	0.00	21.65	0.00	52.21	3.068	18.39	-----	0.00	0.000

Fire Sprinkler Output Data

Overall Pipe Output Data (cont'd)

Beg. End. Node	Nodal KFactor (K)	Elevation (feet)	Spk/Hose Discharge (gpm)	Residual Pressure (psi)	Nom. Dia. Inside Dia. C-Value	Q (gpm) Velocity (fps)	F. L./ft (psi/ft) Fittings Type-Grp	Pipe-Len. Fit-Len. Tot-Len. (ft)	PF-(psi) PE-(psi) PV-(psi)
			SCHED 40 WET STEEL		120		0	18.37	2.275
30	0.00	21.65	0.00	52.21	3.00	423.63	0.19859	47.90	9.512
31	0.00	21.65	0.00	61.72	3.068	18.39	----	0.00	0.000
			SCHED 40 WET STEEL		120		0	47.90	2.275
31	0.00	21.65	0.00	61.72	4.00	423.63	0.05287	24.61	1.830
32	0.00	21.65	0.00	63.55	4.026	10.68	E	10.00	0.000
			SCHED 40 WET STEEL		120		0	34.61	0.767
32	0.00	21.65	0.00	63.55	4.00	423.63	0.05287	147.64	8.334
33	0.00	21.65	0.00	71.88	4.026	10.68	E	10.00	0.000
			SCHED 40 WET STEEL		120		0	157.64	0.767
33	0.00	21.65	0.00	71.88	4.00	423.63	0.05287	24.61	1.830
34	0.00	21.65	0.00	73.71	4.026	10.68	E	10.00	0.000
			SCHED 40 WET STEEL		120		0	34.61	0.767
34	0.00	21.65	0.00	73.71	4.00	423.63	0.05287	45.93	2.957
35	0.00	21.65	0.00	76.67	4.026	10.68	E	10.00	0.000
			SCHED 40 WET STEEL		120		0	55.93	0.767
35	0.00	21.65	0.00	76.67	4.00	423.63	0.05287	5.91	0.841
36	0.00	21.65	0.00	77.51	4.026	10.68	E	10.00	0.000
			SCHED 40 WET STEEL		120		0	15.91	0.767
36	0.00	21.65	0.00	77.51	4.00	423.63	0.05287	2.63	0.773
37	0.00	21.65	0.00	78.29	4.026	10.68	B	12.00	0.000
			SCHED 40 WET STEEL		120		0	14.63	0.767
37	0.00	21.65	0.00	78.29	4.00	423.63	0.05287	2.63	0.667
38	0.00	21.65	0.00	78.95	4.026	10.68	E	10.00	0.000
			SCHED 40 WET STEEL		120		0	12.63	0.767
38	0.00	21.65	0.00	78.95	4.00	423.63	0.05287	17.72	1.465
39	0.00	21.65	0.00	80.42	4.026	10.68	E	10.00	0.000
			SCHED 40 WET STEEL		120		0	27.72	0.767
39	0.00	21.65	0.00	80.42	4.00	423.63	0.05287	30.18	2.125
40	0.00	21.65	0.00	82.54	4.026	10.68	E	10.00	0.000
			SCHED 40 WET STEEL		120		0	40.18	0.767
40	0.00	21.65	0.00	82.54	4.00	423.63	0.05287	10.83	1.101
41	0.00	10.83	0.00	88.33	4.026	10.68	E	10.00	4.688
			SCHED 40 WET STEEL		120		0	20.83	0.767
41	0.00	10.83	0.00	88.33	4.00	423.63	0.05287	31.82	2.211
42	0.00	10.83	0.00	90.54	4.026	10.68	E	10.00	0.000
			SCHED 40 WET STEEL		120		0	41.82	0.767
42	0.00	10.83	0.00	90.54	4.00	423.63	0.05287	1.64	0.615
43	0.00	0.00	0.00	95.85	4.026	10.68	E	10.00	4.688
			SCHED 40 WET STEEL		120		0	11.64	0.767
43	0.00	0.00	0.00	95.85	4.00	423.63	0.05287	9.19	1.860
44	0.00	0.00	0.00	97.71	4.026	10.68	2GC	26.00	0.000
			SCHED 40 WET STEEL		120		0	35.19	0.767

Fire Sprinkler Output Data

Overall Pipe Output Data (cont'd)

Beg. End. Node	Nodal KFactor (K)	Elevation (feet)	Spk/Hose Discharge (gpm)	Residual Pressure (psi)	Nom. Dia. Inside Dia. C-Value	Q (gpm) Velocity (fps)	F. L./ft (psi/ft) Fittings Type-Grp	Pipe-Len. Fit-Len. Tot-Len. (ft)	PF-(psi) PE-(psi) PV-(psi)
44	0.00	0.00	0.00	97.71	8.00	423.63	0.00189	16.40	0.139
45	0.00	0.00	0.00	97.85	7.981	2.72	BC	57.00	0.000
	SCHED 40 WET STEEL				120		0	73.40	0.050

Fire Sprinkler Output Data

Overall Sprinkler Output Data

Flowing Sprinkler Node No.	Area Group Code	Sprinkler KFactor (K)	Sprinkler Elevation (feet)	Residual Pressure (psi)	Flowing Area (ft ²)	Flowing Density (gpm/ft ²)	Sprinkler Discharge (gpm)
Totals For All Groups					0.00	0.000	0.00

Fire Sprinkler Output Summary

Hydraulically Most Demanding Sprinkler Node

HMD Sprinkler Node Number:	2
HMD Actual Residual Pressure:	12.13 psi
HMD Actual GPM:	19.50 gpm

Sprinkler Summary

Sprinkler System Type:	Wet
Specified Area Of Application:	1500.00 ft ²
Minimum Desired Density:	0.150 gpm/ft ²
Application Average Density:	0.282 gpm/ft ²
Application Average Area Per Sprinkler:	93.75 ft ²
Sprinkler Flow:	423.66 gpm
Average Sprinkler Flow:	26.48 gpm

Flow Velocity And Imbalance Summary

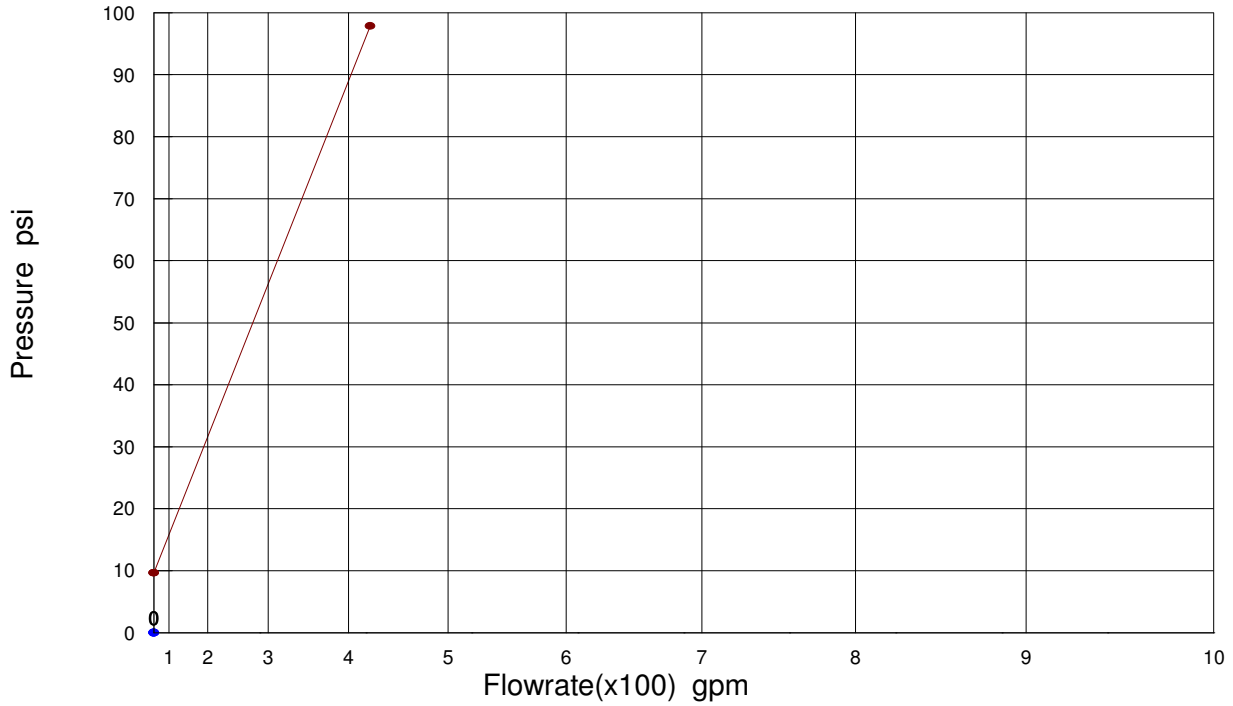
Maximum Flow Velocity (In Pipe 19 - 29)	22.32 ft/sec
Maximum Velocity Pressure (In Pipe 19 - 29)	3.35 psi
Allowable Maximum Nodal Pressure Imbalance:	0.0100 psi
Actual Maximum Nodal Pressure Imbalance:	0.0086 psi
Actual Average Nodal Pressure Imbalance:	0.0030 psi
Actual Maximum Nodal Flow Imbalance:	0.0047 gpm
Actual Average Nodal Flow Imbalance:	0.0007 gpm

Overall Network Summary

Number Of Unique Pipe Sections:	44
Number Of Flowing Sprinklers:	16
Pipe System Water Volume:	100.54 gal
Sprinkler Flow:	423.66 gpm
Non-Sprinkler Flow:	0.00 gpm
Total System Demand Flow:	423.66 gpm
Minimum Required Residual Pressure At System Inflow Node:	97.85 psi
Demand Flow At System Inflow Node:	423.63 gpm

Fire Sprinkler Output Data

Hydraulic Supply/Demand Graph



Adjusted Hydrant Data

Static Pressure: 0 psi
Test Residual Pressure: 0 psi
Test Flow Rate: 0 gpm

Demand Point Data

Calculated Residual Pressure: 97.85 psi
Calculated Flow Rate: 423.63 gpm
Excess Available Inflow Residual Pressure: -97.85 psi