



CIVIL CONSULTANTS, INC.  
August 10, 2024

El Paso County  
Planning & Community Development  
2880 International Circle, Suite 110  
Colorado Springs, CO 80910

Attn.: Project Manager

RE: Paint Brush Hills Filing No. 13E

Dear Project Manager:

On behalf of Aeroplaaza Fountain LLC, & Heidi LLC, M&S Civil Consultants hereby requests that the street, storm sewer and BMP improvements installed as a part of Paint Brush Hills Filing No. 13E be accepted for County Maintenance. The as-built construction plans which include; street, storm sewer, and water quality and detention basin improvements are attached.

#### Street Improvements

The street improvements for Paint Brush Hills Filing No. 13E consist of asphalt paving, curb and gutter, cross pans, pedestrian ramps and street signage for the following streets:

- Triborough Trail – Sta: 1+21.99 – Sta: 15+69.39
- Beckham Street – Sta: 1+22.12 – Sta: 21+78.25
- Asbee Street – Sta: 1+16.89 - Sta: 4+29.91
- Bracknell Place – Sta: 1+00.00 - Sta: 12+76.83
- Devoncove Drive – Sta: 1+22.00 - Sta: 14+43.33
- Wingfiel Lane – Sta: 1+17.14 – Sta: 7+31.51
- Hillandale Way – Sta: 1+17.00 – Sta: 5+83.39
- Keating Drive – Sta: 1+00.00 – Sta 18+67.77

Based upon this information gathered during periodic site visits to the project, M&S Civil Consultants, Inc. is of the opinion that the street improvements have been constructed in general compliance with the approved design plans, and specifications as filed with El Paso County.

On behalf of Aeroplaaza Fountain LLC, & Heidi LLC, M&S Civil Consultants hereby requests that probationary inspection of these facilities by the County so that the warranty period may begin.

#### Storm Sewer Improvements

Per the approved construction drawings for "Paint Brush Hills Filing 13E" drainage improvements were made to construct storm sewer infrastructure and a water quality and detention facility in compliance with the current El Paso County Drainage Criteria and with the approved Final Drainage Report for this project.



The drainage related improvements for Paint Brush Hills Filing No. 13E consist of:

- Type I and Type II manholes,
- 5', 10' and 15' Type R inlet boxes
- 18", 24", 30" and 36" Reinforced Concrete Pipe
- 24" & 36" Reinforced Concrete Pipe Flared End Sections
- 30" RCP Plug
- Type L Riprap Stilling Basin
- Turf Reinforcement Mat
- Water Quality and Detention Facility
  - Concrete Trickle Channel
  - Two (2) Concrete Forebay w/ Riprap Apron
  - 8'x4' Outlet Box w/ Micropool
  - Spillway w/ Cutoff Wall and Buried VH Soil Riprap

Based upon this information gathered during periodic site visits to the project, M&S Civil Consultants, Inc. is of the opinion that the street improvements have been constructed in general compliance with the approved design plans, and specifications as filed with El Paso County.

Statement of Engineer In Responsible Charge

To the best of my knowledge, information and belief, for the referenced project above, the improvements have been constructed in general compliance with the approved design plans and specifications as filed with El Paso County to provide the required storage volume and meet the required release rates documented by the SDI design form, the stage areas, elevations and outlet dimensions. In addition, to the best of my knowledge, information and belief, for the referenced project above, the site and adjacent properties (as affected by work performed under the County permit) are stable with respect to settlement and subsidence, sloughing of cut and fill slopes, revegetation or other ground cover, and that the improvements (public improvements, common development improvements, site grading and paving) meet or exceed the minimum design requirements.

Respectfully submitted,

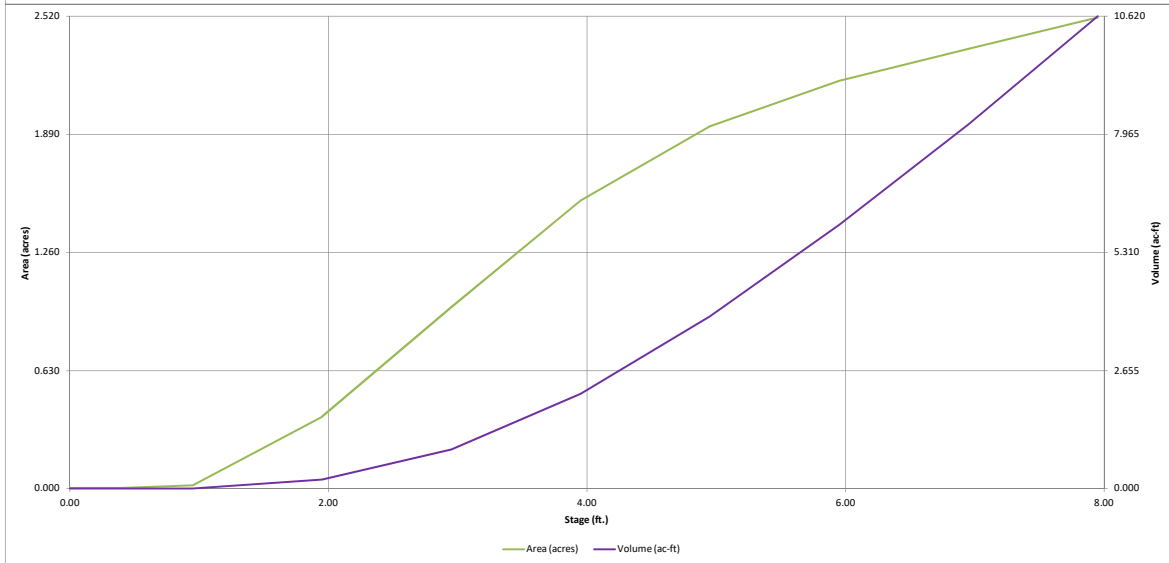
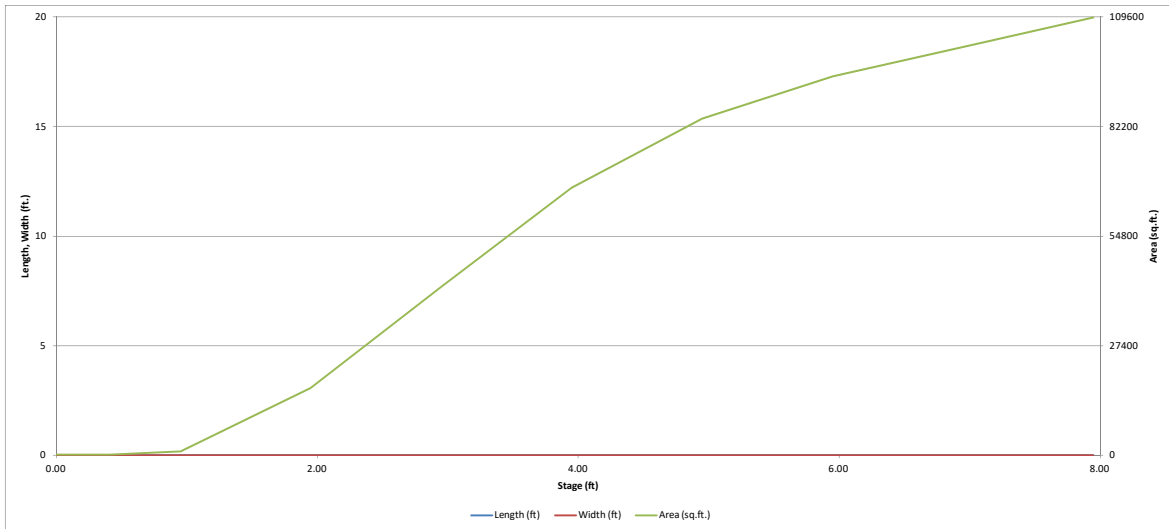
Virgil A. Sanchez  
Colorado P.E. No.37160  
For and on behalf of M&S Civil  
Consultants, Inc.





# DETENTION BASIN STAGE-STORAGE TABLE BUILDER

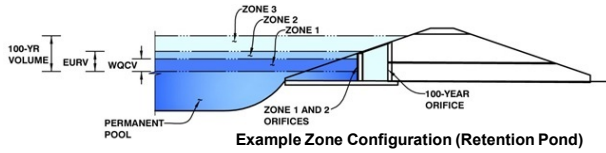
*MHFD-Detention, Version 4.06 (July 2022)*



# DETENTION BASIN OUTLET STRUCTURE DESIGN

MHFD- Detention, Version 4.06 (July 2022)

**Project: PAINT BRUSH HILLS FILING 13E**  
**Basin ID: POND D (AS-BUILT)**



	Estimated Stage (ft)	Estimated Volume (ac-ft)	Outlet Type
Zone 1 (WQCV)	2.96	0.886	Orifice Plate
Zone 2 (EURV)	3.91	1.175	Orifice Plate
Zone 3 (100-year)	5.36	2.612	Weir&Pipe (Restrict)
<b>Total (all zones)</b>		<b>4.674</b>	

User Input: Orifice at Underdrain Outlet (typically used to drain WQCV in a Filtration BMP)

Underdrain Orifice Invert Depth =  ft (distance below the filtration media surface)  
 Underdrain Orifice Diameter =  inches

Calculated Parameters for Underdrain  
 Underdrain Orifice Area =  ft<sup>2</sup>  
 Underdrain Orifice Centroid =  feet

User Input: Orifice Plate with one or more orifices or Elliptical Slot Weir (typically used to drain WQCV and/or EURV in a sedimentation BMP)

Centroid of Lowest Orifice =  ft (relative to basin bottom at Stage = 0 ft)  
 Depth at top of Zone using Orifice Plate =  ft (relative to basin bottom at Stage = 0 ft)  
 Orifice Plate: Orifice Vertical Spacing =  inches  
 Orifice Plate: Orifice Area per Row =  sq. inches

Calculated Parameters for Plate  
 WQ Orifice Area per Row =  ft<sup>2</sup>  
 Elliptical Half-Width =  feet  
 Elliptical Slot Centroid =  feet  
 Elliptical Slot Area =  ft<sup>2</sup>

User Input: Stage and Total Area of Each Orifice Row (numbered from lowest to highest)

	Row 1 (required)	Row 2 (optional)	Row 3 (optional)	Row 4 (optional)	Row 5 (optional)	Row 6 (optional)	Row 7 (optional)	Row 8 (optional)
Stage of Orifice Centroid (ft)	0.00	1.25	2.55					
Orifice Area (sq. inches)	3.51	3.51	3.51					

	Row 9 (optional)	Row 10 (optional)	Row 11 (optional)	Row 12 (optional)	Row 13 (optional)	Row 14 (optional)	Row 15 (optional)	Row 16 (optional)
Stage of Orifice Centroid (ft)								
Orifice Area (sq. inches)								

User Input: Vertical Orifice (Circular or Rectangular)

	Not Selected	Not Selected	
Invert of Vertical Orifice =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Depth at top of Zone using Vertical Orifice =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	ft (relative to basin bottom at Stage = 0 ft)
Vertical Orifice Diameter =	<input type="text" value="N/A"/>	<input type="text" value="N/A"/>	inches

Calculated Parameters for Vertical Orif  
 Vertical Orifice Area =  ft<sup>2</sup>  
 Vertical Orifice Centroid =  feet

User Input: Overflow Weir (Dropbox with Flat or Sloped Gate and Outlet Pipe OR Rectangular/Trapezoidal Weir and No Outlet Pipe)

	Zone 3 Weir	Not Selected	
Overflow Weir Front Edge Height, Ho =	3.71	N/A	ft (relative to basin bottom at Stage = 0 ft)
Overflow Weir Front Edge Length =	8.00	N/A	feet
Overflow Weir Gate Slope =	4.00	N/A	H:V
Horiz. Length of Weir Sides =	4.00	N/A	feet
Overflow Gate Type =	Type C Gate	N/A	
Debris Clogging % =	50%	N/A	%

Calculated Parameters for Overflow W  
 Height of Gate Upper Edge, H<sub>1</sub> =  feet  
 Overflow Weir Slope Length =  feet  
 Gate Open Area / 100-yr Orifice Area =  ft<sup>2</sup>  
 Overflow Gate Open Area w/o Debris =  ft<sup>2</sup>  
 Overflow Gate Open Area w/ Debris =  ft<sup>2</sup>

User Input: Outlet Pipe w/ Flow Restriction Plate (Circular Orifice, Restrictor Plate, or Rectangular Orifice)

	Zone 3 Restrictor	Not Selected	
Depth to Invert of Outlet Pipe =	2.39	N/A	ft (distance below basin bottom at Stage = 0 ft)
Outlet Pipe Diameter =	36.00	N/A	inches
Restrictor Plate Height Above Pipe Invert =	36.00	N/A	inches

Calculated Parameters for Outlet Pipe w/ Flow Restriction Pl  
 Outlet Orifice Area =  ft<sup>2</sup>  
 Outlet Orifice Centroid =  feet  
 Half-Central Angle of Restrictor Plate on Pipe =  degrees

User Input: Emergency Spillway (Rectangular or Trapezoidal)

Spillway Invert Stage =  ft (relative to basin bottom at Stage = 0 ft)  
 Spillway Crest Length =  feet  
 Spillway End Slopes =  H:V  
 Freeboard above Max Water Surface =  feet

Calculated Parameters for Spillway  
 Spillway Design Flow Depth =  feet  
 Stage at Top of Freeboard =  feet  
 Basin Area at Top of Freeboard =  acres  
 Basin Volume at Top of Freeboard =  acre-ft

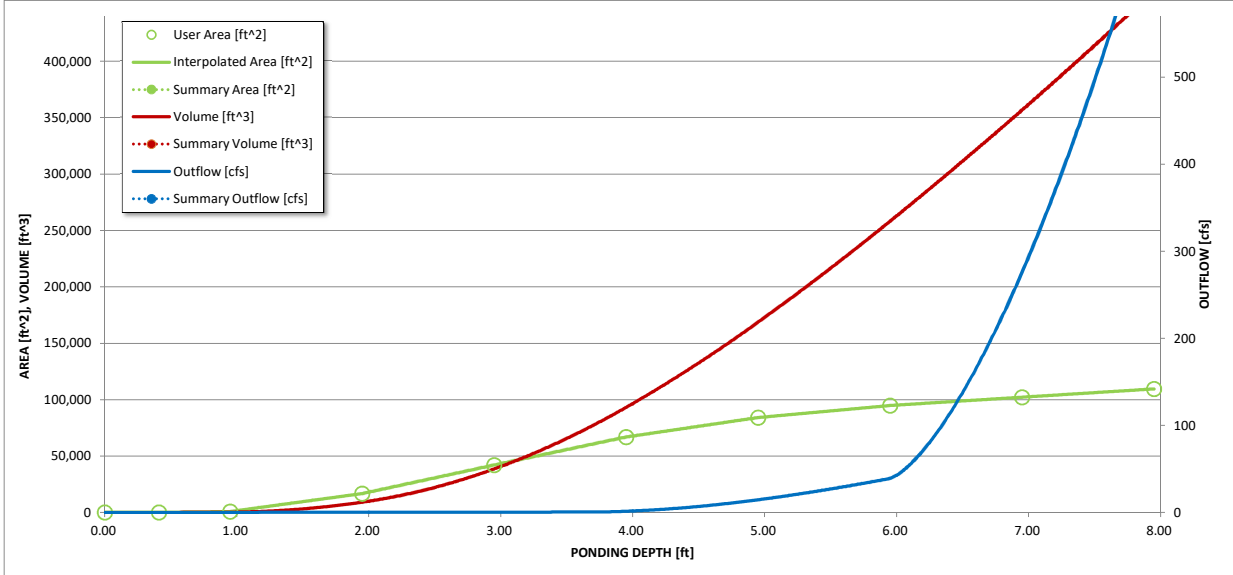
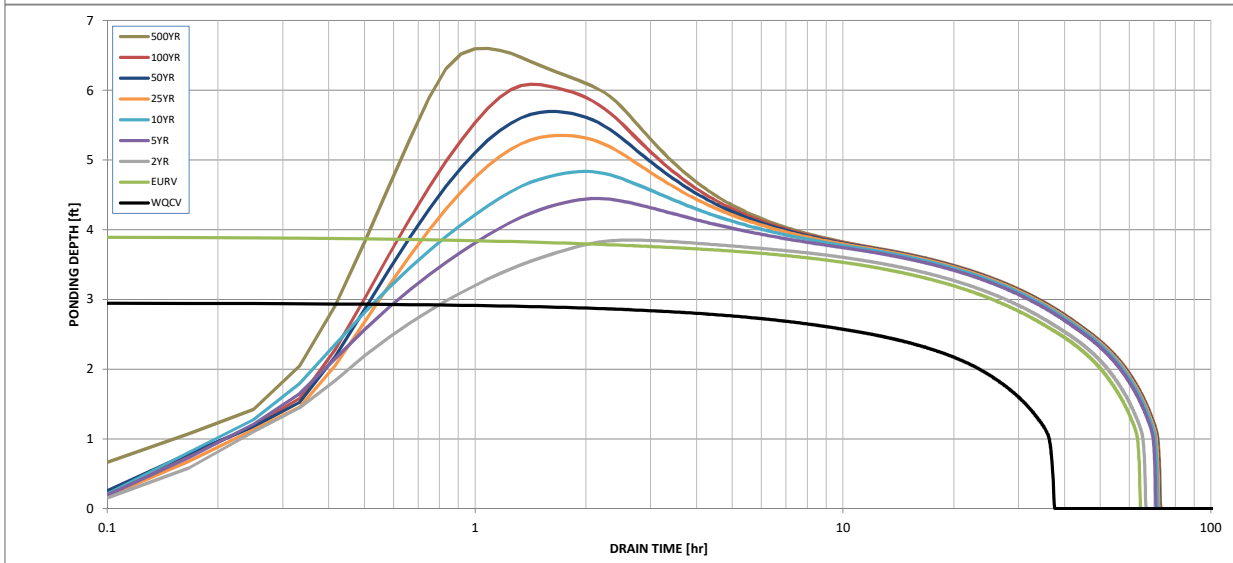
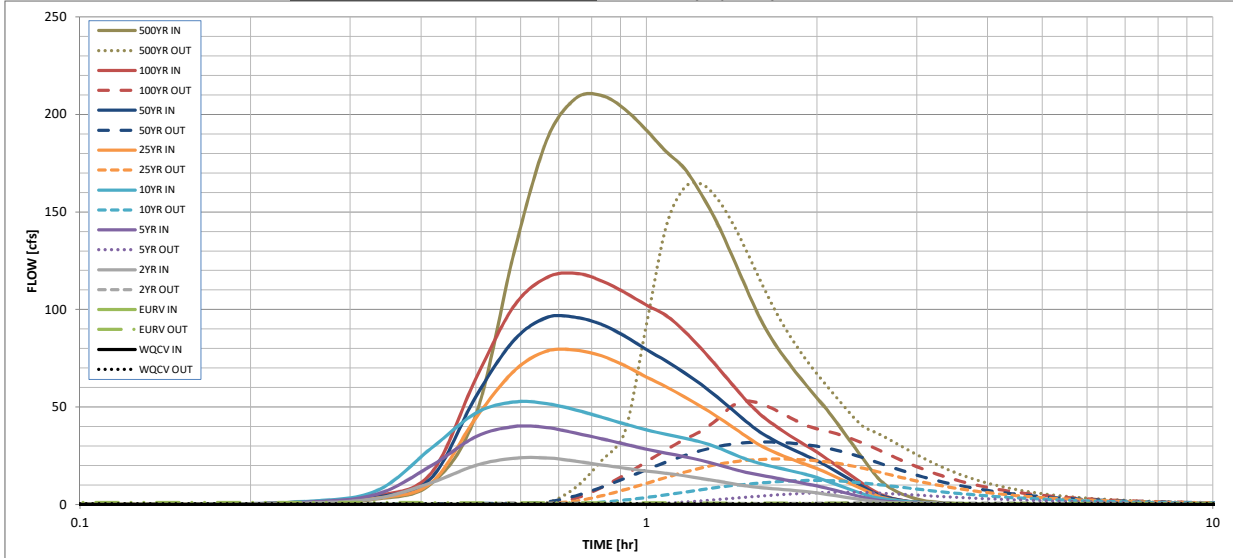
## Routed Hydrograph Results

The user can override the default CUHP hydrographs and runoff volumes by entering new values in the Inflow Hydrographs table (Columns W through AI)

	WQCV	EURV	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
Design Storm Return Period =								
One-Hour Rainfall Depth (in) =	N/A	N/A	1.19	1.50	1.75	2.00	2.25	2.52
CUHP Runoff Volume (acre-ft) =	0.886	2.062	2.127	3.558	4.887	6.936	8.464	10.524
Inflow Hydrograph Volume (acre-ft) =	N/A	N/A	2.127	3.558	4.887	6.936	8.464	10.524
CUHP Predevelopment Peak Q (cfs) =	N/A	N/A	7.6	21.3	32.4	57.9	72.7	92.6
OPTIONAL Override Predevelopment Peak Q (cfs) =	N/A	N/A						
Predevelopment Unit Peak Flow, q (cfs/acre) =	N/A	N/A	0.10	0.28	0.43	0.77	0.97	1.23
Peak Inflow Q (cfs) =	N/A	N/A	23.9	40.0	52.6	79.0	95.9	118.6
Peak Outflow Q (cfs) =	0.4	1.2	0.9	6.2	12.4	23.4	32.0	52.9
Ratio Peak Outflow to Predevelopment Q =	N/A	N/A	N/A	0.3	0.4	0.4	0.4	0.6
Structure Controlling Flow =	Plate	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Overflow Weir 1	Spillway
Max Velocity through Gate 1 (fps) =	N/A	0.03	0.02	0.2	0.5	1.0	1.4	1.8
Max Velocity through Gate 2 (fps) =	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Time to Drain 97% of Inflow Volume (hours) =	35	59	61	63	62	59	57	55
Time to Drain 99% of Inflow Volume (hours) =	36	62	64	67	67	66	66	65
Maximum Ponding Depth (ft) =	2.96	3.91	3.85	4.45	4.83	5.35	5.69	6.09
Area at Maximum Ponding Depth (acres) =	0.97	1.51	1.48	1.73	1.88	2.03	2.11	2.20
Maximum Volume Stored (acre-ft) =	0.895	2.076	1.986	2.938	3.642	4.664	5.368	6.211

# DETENTION BASIN OUTLET STRUCTURE DESIGN

*MHFD-Detention, Version 4.06 (July 2022)*



S-A-V-D Chart Axis Override	X-axis	Left Y-Axis	Right Y-Axis
minimum bound			
maximum bound			

# DETENTION BASIN OUTLET STRUCTURE DESIGN

Outflow Hydrograph Workbook Filename: \_\_\_\_\_

## Inflow Hydrographs

The user can override the calculated inflow hydrographs from this workbook with inflow hydrographs developed in a separate program.

Time Interval	SOURCE	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP	CUHP
	TIME	WQCV [cfs]	EURV [cfs]	2 Year [cfs]	5 Year [cfs]	10 Year [cfs]	25 Year [cfs]	50 Year [cfs]	100 Year [cfs]	500 Year [cfs]
5.00 min	0:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	0:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.61
	0:15:00	0.00	0.00	0.76	1.24	1.54	1.04	1.35	1.29	2.79
	0:20:00	0.00	0.00	3.02	5.21	6.94	3.09	3.72	4.40	10.53
	0:25:00	0.00	0.00	11.11	19.84	28.71	10.96	13.44	16.04	45.90
	0:30:00	0.00	0.00	20.11	34.83	46.86	44.30	55.30	64.59	128.51
	0:35:00	0.00	0.00	23.74	40.01	52.57	68.25	83.99	101.56	186.69
	0:40:00	0.00	0.00	23.94	39.53	51.73	78.60	95.80	116.31	208.20
	0:45:00	0.00	0.00	22.26	36.64	48.49	79.03	95.89	118.55	209.73
	0:50:00	0.00	0.00	20.32	33.74	44.78	76.18	92.29	114.69	202.60
	0:55:00	0.00	0.00	18.64	30.96	41.27	71.07	86.21	108.64	191.89
	1:00:00	0.00	0.00	17.18	28.41	38.27	65.30	79.37	102.23	181.03
	1:05:00	0.00	0.00	16.04	26.37	35.97	60.31	73.58	96.94	172.38
	1:10:00	0.00	0.00	14.76	24.60	33.96	55.17	67.50	88.89	159.14
	1:15:00	0.00	0.00	13.39	22.67	31.96	50.16	61.49	79.97	144.37
	1:20:00	0.00	0.00	12.04	20.53	29.29	44.99	55.09	70.67	127.60
	1:25:00	0.00	0.00	10.73	18.40	26.15	39.92	48.76	61.68	110.98
	1:30:00	0.00	0.00	9.57	16.52	23.25	34.90	42.54	53.40	96.16
	1:35:00	0.00	0.00	8.71	15.19	21.14	30.51	37.32	46.64	84.71
	1:40:00	0.00	0.00	8.12	13.99	19.51	27.29	33.45	41.56	75.73
	1:45:00	0.00	0.00	7.61	12.81	18.06	24.67	30.25	37.33	67.99
	1:50:00	0.00	0.00	7.14	11.70	16.73	22.40	27.44	33.57	61.06
	1:55:00	0.00	0.00	6.54	10.64	15.37	20.32	24.87	30.13	54.67
	2:00:00	0.00	0.00	5.92	9.62	13.85	18.39	22.47	26.92	48.65
	2:05:00	0.00	0.00	5.18	8.40	12.07	16.18	19.69	23.45	42.06
	2:10:00	0.00	0.00	4.43	7.15	10.26	13.91	16.85	20.05	35.54
	2:15:00	0.00	0.00	3.72	5.95	8.53	11.71	14.10	16.76	29.23
	2:20:00	0.00	0.00	3.03	4.80	6.91	9.59	11.45	13.57	23.19
	2:25:00	0.00	0.00	2.38	3.73	5.41	7.56	8.93	10.50	17.46
	2:30:00	0.00	0.00	1.79	2.76	4.07	5.62	6.56	7.61	12.54
	2:35:00	0.00	0.00	1.34	2.08	3.19	3.89	4.64	5.36	9.31
	2:40:00	0.00	0.00	1.05	1.67	2.60	2.84	3.45	3.91	7.03
	2:45:00	0.00	0.00	0.85	1.37	2.13	2.13	2.62	2.88	5.27
	2:50:00	0.00	0.00	0.70	1.12	1.74	1.62	2.00	2.10	3.91
	2:55:00	0.00	0.00	0.58	0.92	1.42	1.23	1.53	1.52	2.86
	3:00:00	0.00	0.00	0.47	0.74	1.14	0.96	1.18	1.09	2.07
	3:05:00	0.00	0.00	0.39	0.60	0.92	0.74	0.92	0.79	1.52
	3:10:00	0.00	0.00	0.32	0.48	0.73	0.58	0.72	0.60	1.19
	3:15:00	0.00	0.00	0.26	0.38	0.56	0.46	0.56	0.48	0.93
	3:20:00	0.00	0.00	0.21	0.29	0.44	0.36	0.44	0.39	0.74
	3:25:00	0.00	0.00	0.17	0.22	0.34	0.28	0.34	0.30	0.58
	3:30:00	0.00	0.00	0.13	0.16	0.26	0.22	0.26	0.23	0.44
	3:35:00	0.00	0.00	0.09	0.12	0.19	0.16	0.19	0.17	0.31
	3:40:00	0.00	0.00	0.06	0.08	0.13	0.11	0.14	0.12	0.21
	3:45:00	0.00	0.00	0.04	0.05	0.08	0.08	0.09	0.08	0.13
	3:50:00	0.00	0.00	0.02	0.03	0.05	0.05	0.05	0.04	0.06
	3:55:00	0.00	0.00	0.01	0.02	0.02	0.02	0.02	0.02	0.02
	4:00:00	0.00	0.00	0.00	0.01	0.01	0.01	0.01	0.00	0.00
	4:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	4:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:05:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:10:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:15:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:20:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:25:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:30:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:35:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:40:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:45:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:50:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5:55:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
6:00:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	



















