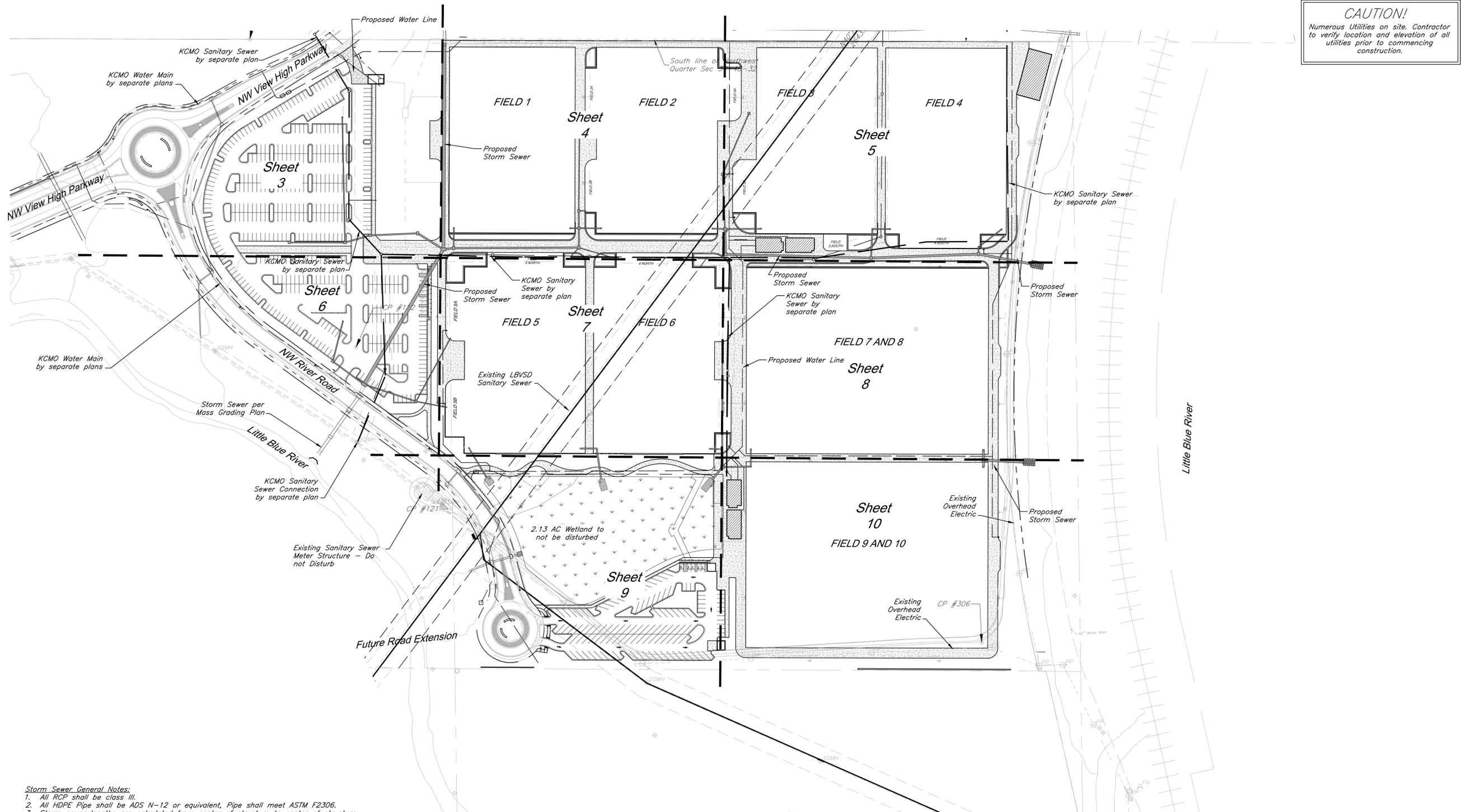




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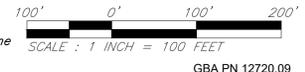


**CAUTION!**  
 Numerous Utilities on site. Contractor to verify location and elevation of all utilities prior to commencing construction.

- Storm Sewer General Notes:**
- All RCP shall be class III.
  - All HDPE Pipe shall be ADS N-12 or equivalent, Pipe shall meet ASTM F2306.
  - Storm sewer lengths are calculated from center of structure to center of structure.
  - All pipe connections to Inlets shall occur at center of structure wall unless specifically noted otherwise.
  - All work shall conform to City of Lee's Summit, MO standards.
  - Precast structures shall be constructed with KCMMB 4,000 psi concrete. Shop drawings shall be submitted to the Engineer for review prior to casting.
  - All in grade inlets shall match adjacent slope.
  - Drainage across the project site during construction shall be the Contractor's responsibility. Surface drainage shall be controlled to reduce or prevent the flow of surface water onto adjacent grounds. Contractor shall control downstream erosion and silting during construction. Flexibility is given to the Contractor to make minor grading revisions along roads or between building pads to improve drainage during construction, with prior approval of the engineer.
  - See Sheets 19-24 for construction details.

**Utility Legend**

<ul style="list-style-type: none"> <li>☐ CATV Ped. Cable TV Pedestal</li> <li>⊕ P.P. Power Pole</li> <li>← Guy Anchor</li> <li>⊕ EMH Electrical Manhole</li> <li>⊕ ET Electrical Transformer</li> <li>⊕ G.M. Gas Meter</li> <li>☐ Curb Inlet</li> <li>⊕ SSMH Sanitary Sewer Manhole</li> <li>○ Sanitary Cleanout</li> <li>⊕ L.P. Light Pole</li> <li>⊕ B.H. Boring Hole</li> <li>⊕ Sign</li> <li>☐ Tel. Ped. Telephone Pedestal</li> <li>⊕ T.S. Traffic Signal Post</li> <li>⊕ FMH Traffic Manhole</li> <li>⊕ F.H. Fire Hydrant</li> </ul>	<ul style="list-style-type: none"> <li>⊕ W.M. Water Meter</li> <li>--- Fiber Optic Line</li> <li>--- Fire Protection Line</li> <li>--- G Gas Line</li> <li>--- Over Head Electric</li> <li>--- Over Head Telephone</li> <li>--- Over Head Cable TV</li> <li>--- Property Line</li> <li>--- ROW Right-of-Way Line</li> <li>--- Existing Sanitary Sewer Line</li> <li>--- Existing Underground Electric</li> <li>--- Existing Underground Telephone</li> <li>--- Existing Underground Cable TV</li> <li>--- Existing Water Line</li> <li>--- Proposed Storm Sewer</li> <li>--- Existing Storm Sewer</li> <li>--- Proposed Sanitary Sewer Line</li> </ul>
--	--



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PROJECT:

# Paragon Star Soccer Complex

Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

ISSUE:

10/17/19



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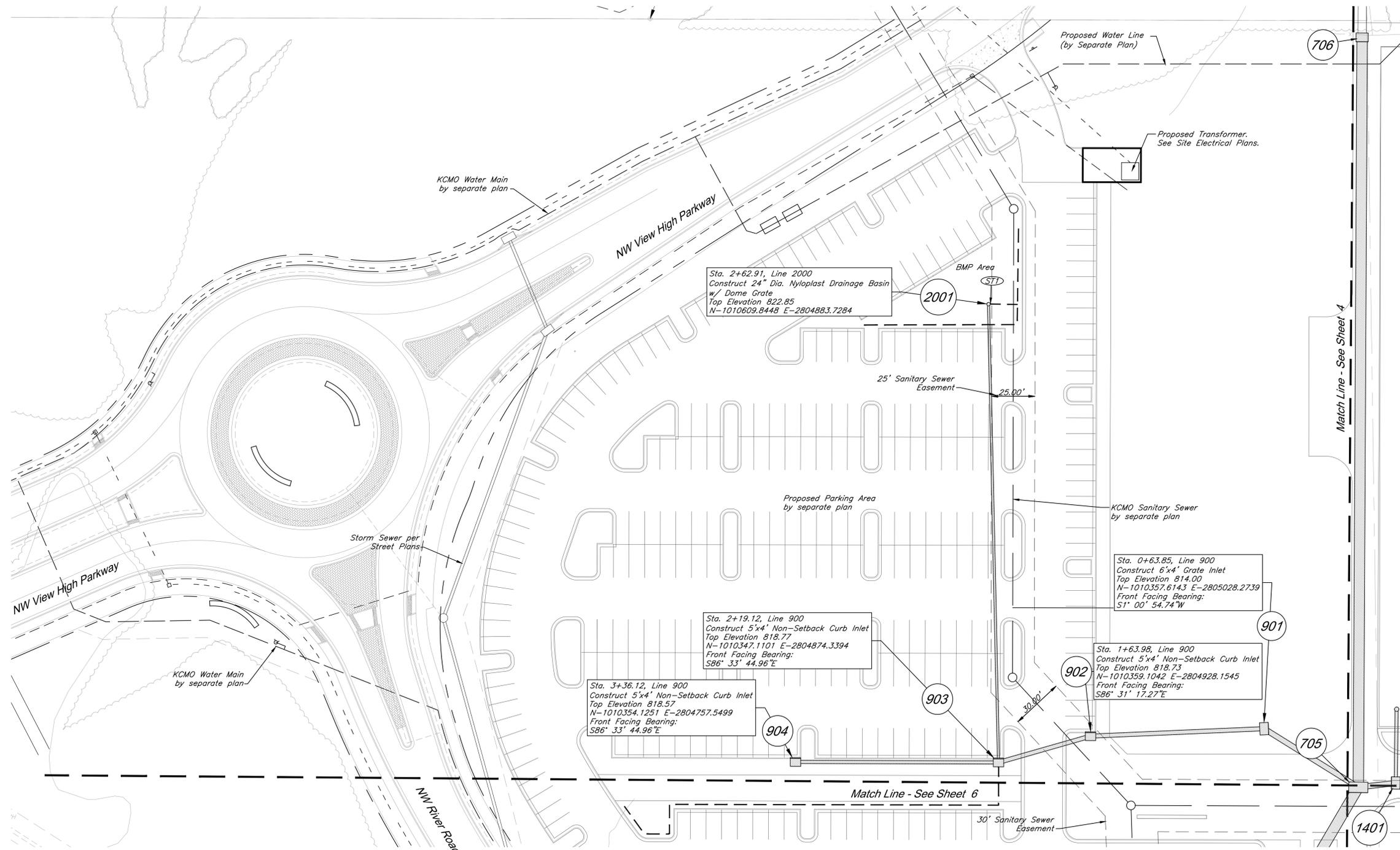
## Utility Plan

JOB NO: 1197      SCALE:

DATE: 10.03.2019      DRAWN BY: GBA

SHEET NO:

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PROJECT:  
**Paragon Star Soccer Complex**  
 Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

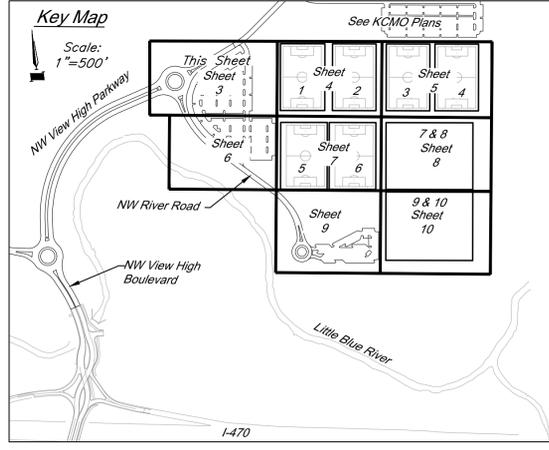
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DRAWING TITLE:  
**Utility Plan**

JOB NO: 1197 SCALE:  
 DATE: 10.03.2019 DRAWN BY: GBA  
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**3**

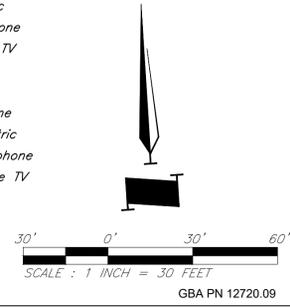
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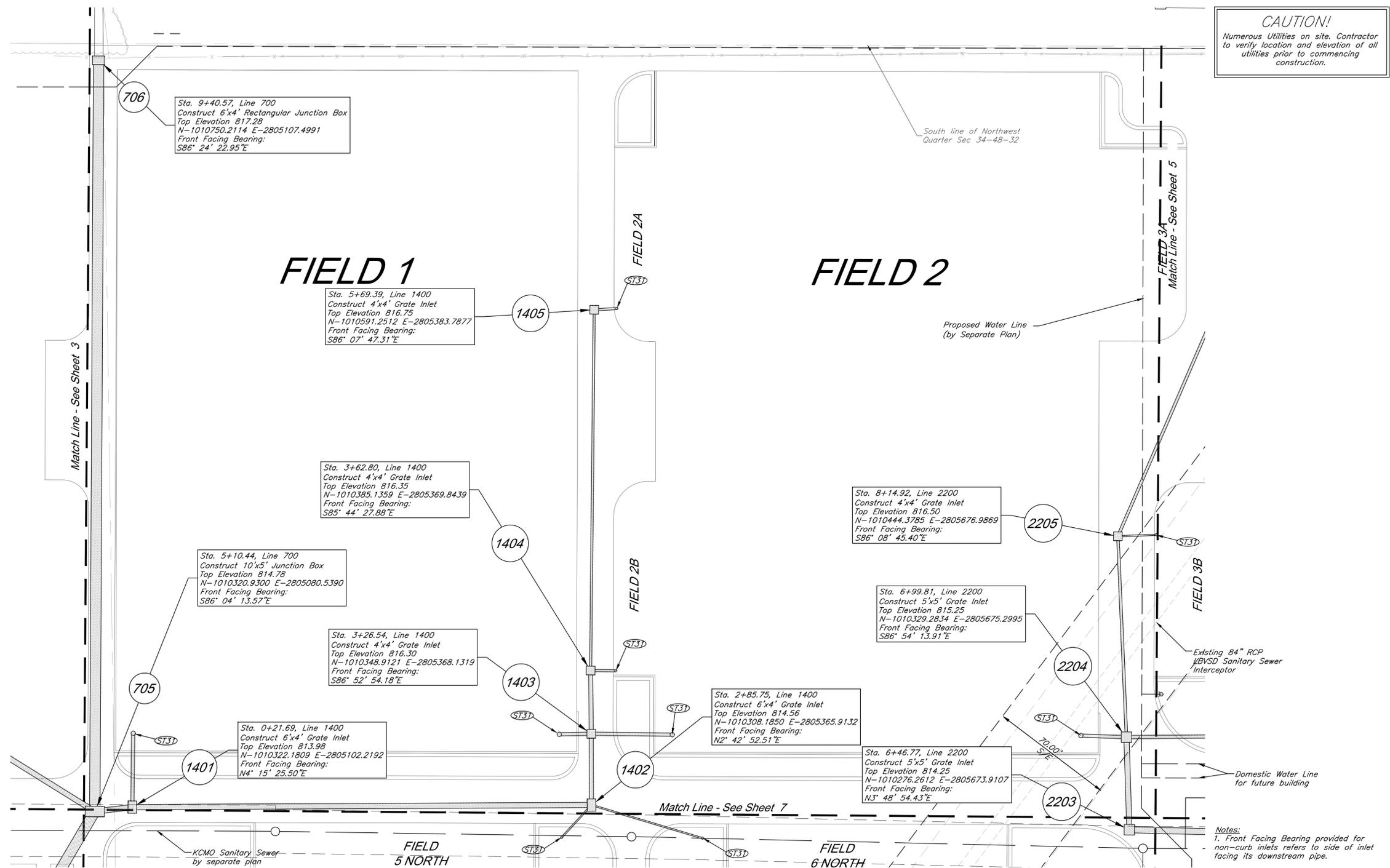
**Storm Sewer Construction Notes:**  
 (ST) Connect Perforated 4" HDPE Underdrain to structure 2001,  $E=819.30$   
 Install 150 LF perforated 4" HDPE pipe @ min. 1% as shown.  
 See construction details.

**Utility Legend**

Existing Cable TV Pedestal	Existing Water Meter
Existing Power Pole	Existing Fiber Optic Line
Existing Guy Anchor	Existing Fire Protection Line
Existing Electrical Manhole	Existing Gas Line
Existing Electrical Transformer	Existing Over Head Electric
Existing Gas Meter	Existing Over Head Telephone
Existing Curb Inlet	Existing Under Head Cable TV
Existing Sanitary Sewer Manhole	Property Line
Existing Sanitary Cleanout	Right-of-Way Line
Existing Light Pole	Existing Sanitary Sewer Line
Existing Boring Hole	Existing Underground Electric
Existing Telephone Pedestal	Existing Underground Telephone
Existing Traffic Signal Post	Existing Underground Cable TV
Existing Fire Manhole	Existing Water Line
Existing Fire Hydrant	Proposed Storm Sewer
	Existing Storm Sewer
	Underdrain



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**CAUTION!**  
 Numerous Utilities on site. Contractor to verify location and elevation of all utilities prior to commencing construction.

Sta. 9+40.57, Line 700  
 Construct 6'x4' Rectangular Junction Box  
 Top Elevation 817.28  
 N-1010750.2114 E-2805107.4991  
 Front Facing Bearing:  
 S86° 24' 22.95"E

Sta. 5+69.39, Line 1400  
 Construct 4'x4' Grate Inlet  
 Top Elevation 816.75  
 N-1010591.2512 E-2805383.7877  
 Front Facing Bearing:  
 S86° 07' 47.31"E

Sta. 3+62.80, Line 1400  
 Construct 4'x4' Grate Inlet  
 Top Elevation 816.35  
 N-1010385.1359 E-2805369.8439  
 Front Facing Bearing:  
 S85° 44' 27.88"E

Sta. 5+10.44, Line 700  
 Construct 10'x5' Junction Box  
 Top Elevation 814.78  
 N-1010320.9300 E-2805080.5390  
 Front Facing Bearing:  
 S86° 04' 13.57"E

Sta. 3+26.54, Line 1400  
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 Top Elevation 816.30  
 N-1010348.9121 E-2805368.1319  
 Front Facing Bearing:  
 S86° 52' 54.18"E

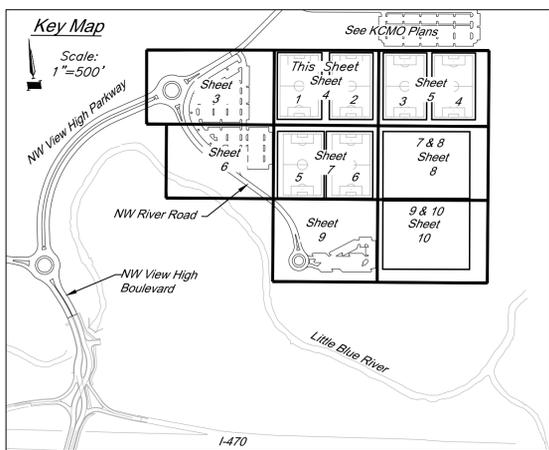
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 Top Elevation 813.98  
 N-1010322.1809 E-2805102.2192  
 Front Facing Bearing:  
 N4° 15' 25.50"E

Sta. 2+85.75, Line 1400  
 Construct 6'x4' Grate Inlet  
 Top Elevation 814.56  
 N-1010308.1850 E-2805365.9132  
 Front Facing Bearing:  
 N2° 42' 52.51"E

Sta. 8+14.92, Line 2200  
 Construct 4'x4' Grate Inlet  
 Top Elevation 816.50  
 N-1010444.3785 E-2805676.9869  
 Front Facing Bearing:  
 S86° 08' 45.40"E

Sta. 6+99.81, Line 2200  
 Construct 5'x5' Grate Inlet  
 Top Elevation 815.25  
 N-1010329.2834 E-2805675.2995  
 Front Facing Bearing:  
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Sta. 6+46.77, Line 2200  
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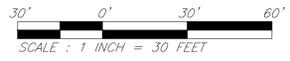


**Storm Sewer Construction Notes:**  
 (ST3) See Athletic Field Plans for field storm sewer

**Utility Legend**

⊠ C.A.V. Ped.	Existing Cable TV Pedestal	⊠ J.W.	Existing Water Meter
⊠ P.P.	Existing Power Pole	⊠ F.O.L.	Existing Fiber Optic Line
⊠ G.A.	Existing Guy Anchor	⊠ F.P.L.	Existing Fire Protection Line
⊠ E.M.H.	Existing Electrical Manhole	⊠ G.L.	Existing Gas Line
⊠ E.T.	Existing Electrical Transformer	⊠ O.H.E.	Existing Over Head Electric
⊠ G.M.	Existing Gas Meter	⊠ O.H.T.	Existing Over Head Telephone
⊠ C.I.	Existing Curb Inlet	⊠ O.H.C.T.V.	Existing Over Head Cable TV
⊠ S.S.M.H.	Existing Sanitary Sewer Manhole	⊠ P.L.	Property Line
⊠ S.C.	Existing Sanitary Cleanout	⊠ R.O.W.	Right-of-Way Line
⊠ L.P.	Existing Light Pole	⊠ S.S.L.	Existing Sanitary Sewer Line
⊠ B.H.	Existing Boring Hole	⊠ U.G.E.	Existing Underground Electric
⊠ S.	Existing Sign	⊠ U.G.T.	Existing Underground Telephone
⊠ T.P.	Existing Telephone Pedestal	⊠ U.G.C.T.V.	Existing Underground Cable TV
⊠ T.S.	Existing Traffic Signal Post	⊠ W.L.	Existing Water Line
⊠ T.M.H.	Existing Traffic Manhole	⊠ P.S.S.	Proposed Storm Sewer
⊠ F.H.	Existing Fire Hydrant	⊠ S.S.	Existing Storm Sewer
		⊠ U.	Underdrain

Notes:  
 1. Front Facing Bearing provided for non-curb inlets refers to side of inlet facing its downstream pipe.



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PROJECT:  
**Paragon Star Soccer Complex**  
 Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

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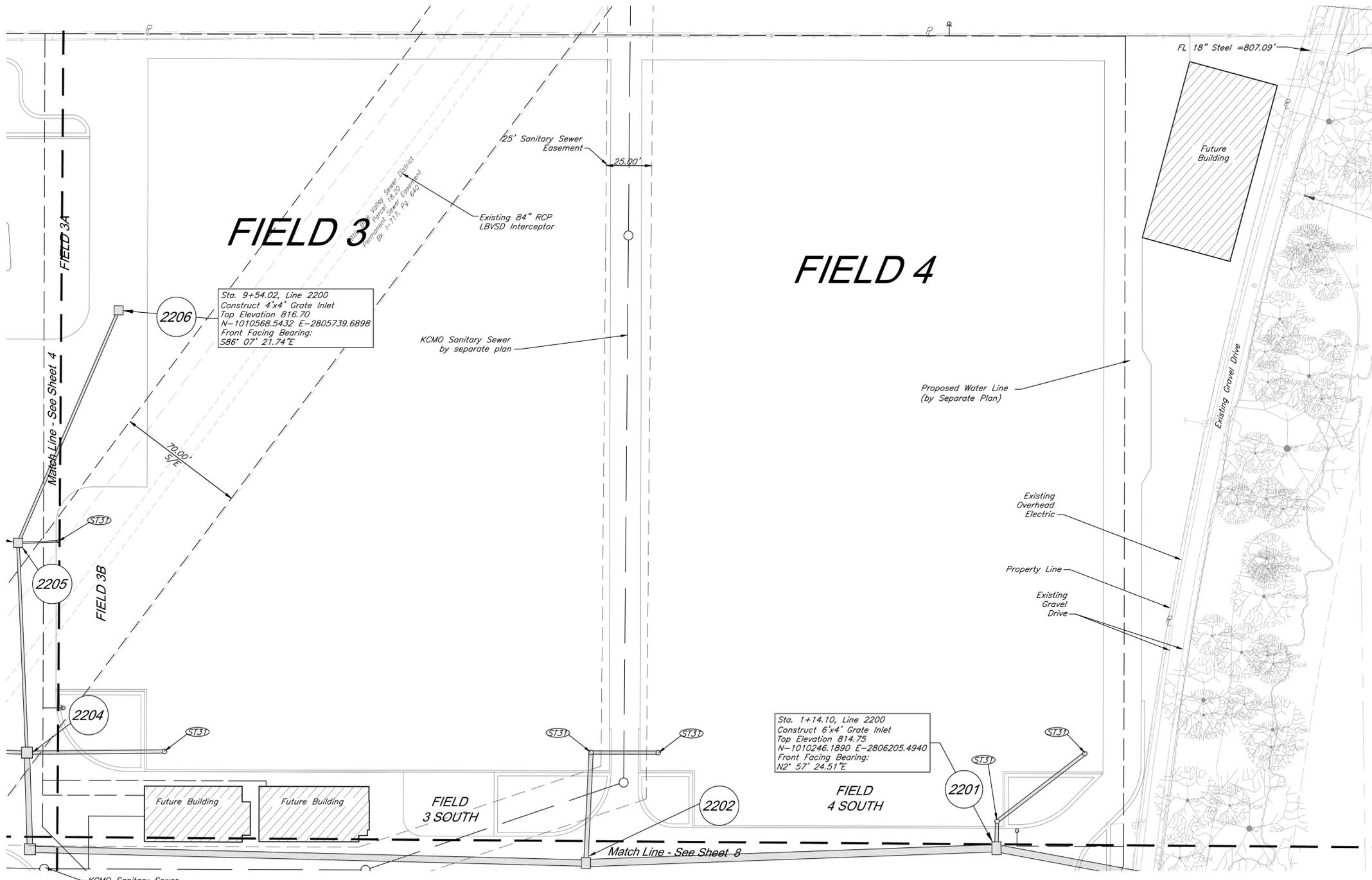


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**Utility Plan**

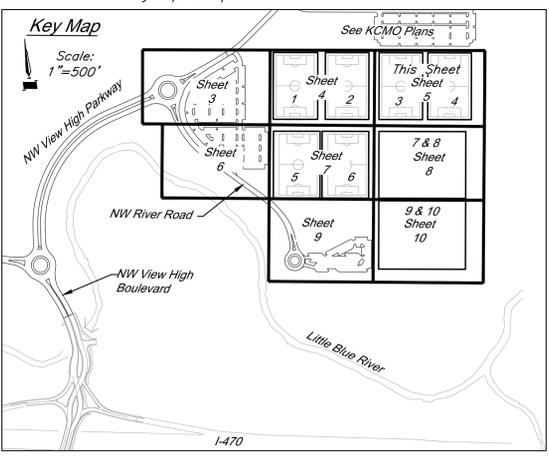
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**CAUTION!**  
 Numerous Utilities on site. Contractor to verify location and elevation of all utilities prior to commencing construction.

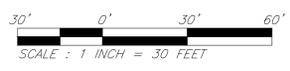


**Storm Sewer Construction Notes:**  
 (ST31) See Athletic Field Plans for field storm sewer

**Utility Legend**

Existing Cable TV Pedestal	Existing Water Meter
Existing Power Pole	Existing Fiber Optic Line
Existing Guy Anchor	Existing Fire Protection Line
Existing Electrical Manhole	Existing Gas Line
Existing Electrical Transformer	Existing Over Head Electric
Existing Gas Meter	Existing Over Head Telephone
Existing Curb Inlet	Existing Over Head Cable TV
Existing Sanitary Sewer Manhole	Property Line
Existing Sanitary Cleanout	Right-of-Way Line
Existing Light Pole	Existing Sanitary Sewer Line
Existing Boring Hole	Existing Underground Electric
Existing Sign	Existing Underground Telephone
Existing Telephone Pedestal	Existing Underground Cable TV
Existing Traffic Signal Post	Existing Water Line
Existing Traffic Manhole	Proposed Storm Sewer
Existing Fire Hydrant	Existing Storm Sewer
	Underdrain

**Notes:**  
 1. Front Facing Bearing provided for non-curb inlets refers to side of inlet facing its downstream pipe.



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 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

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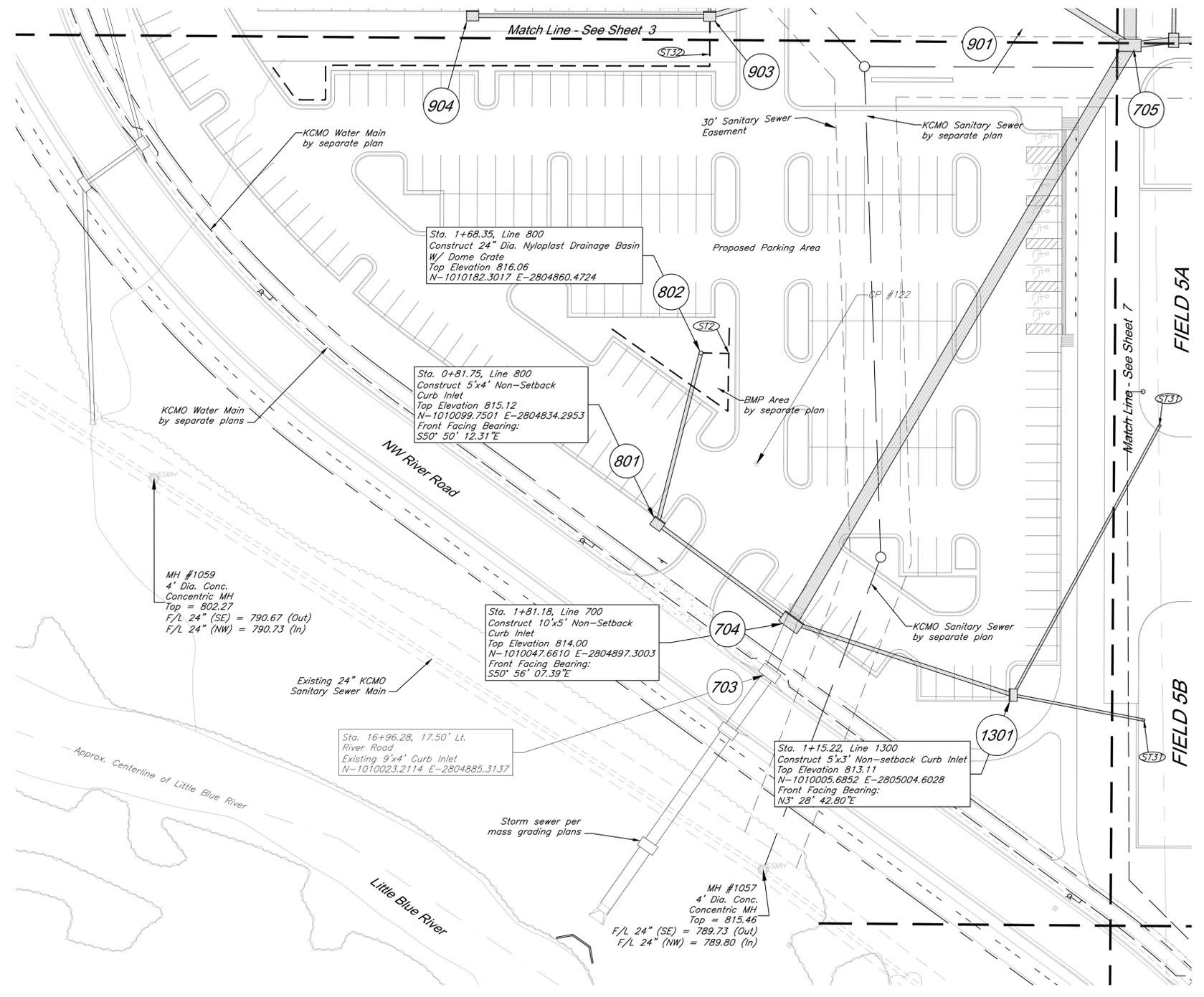


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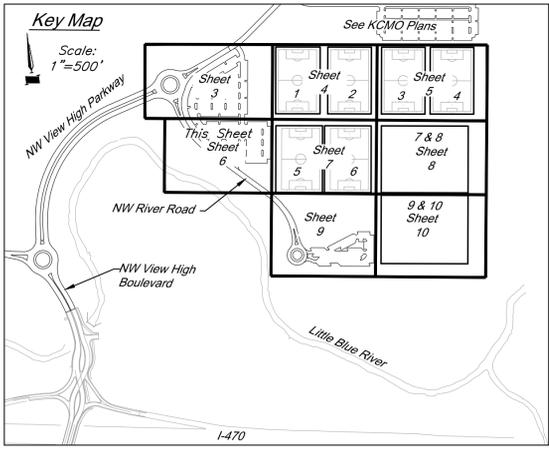
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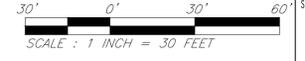
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**Storm Sewer Construction Notes:**  
 (ST2) Connect Perforated 4" HDPE Underdrain to structure 802, E=812.00. Install 120 LF perforated 4" HDPE pipe @ min. 1% as shown. See construction details.  
 (ST3) See Athletic Field Plans for field storm sewer

**Utility Legend**

- |             |                                 |          |                                |
|-------------|---------------------------------|----------|--------------------------------|
| ⊠ CATV Ped  | Existing Cable TV Pedestal      | — C.W.M. | Existing Water Meter           |
| ⊠ P.P.      | Existing Power Pole             | ---      | Existing Fiber Optic Line      |
| ⊠ Guy       | Existing Guy Anchor             | ---      | Existing Fire Protection Line  |
| ⊠ EMH       | Existing Electrical Manhole     | ---      | Existing Gas Line              |
| ⊠ E.T.      | Existing Electrical Transformer | ---      | Existing Over Head Electric    |
| ⊠ G.M.      | Existing Gas Meter              | ---      | Existing Over Head Telephone   |
| ⊠ C.I.      | Existing Curb Inlet             | ---      | Existing Over Head Cable TV    |
| ⊠ SSMH      | Existing Sanitary Sewer Manhole | ---      | Property Line                  |
| ⊠ S.C.      | Existing Sanitary Cleanout      | ---      | Right-of-Way Line              |
| ⊠ L.P.      | Existing Light Pole             | ---      | Existing Sanitary Sewer Line   |
| ⊠ B.H.      | Existing Boring Hole            | ---      | Existing Underground Electric  |
| ⊠ Sign      | Existing Sign                   | ---      | Existing Underground Telephone |
| ⊠ Tel. Ped. | Existing Telephone Pedestal     | ---      | Existing Underground Cable TV  |
| ⊠ T.S.      | Existing Traffic Signal Post    | ---      | Existing Water Line            |
| ⊠ T.M.      | Existing Traffic Manhole        | ---      | Proposed Storm Sewer           |
| ⊠ F.H.      | Existing Fire Hydrant           | ---      | Existing Storm Sewer           |
|             |                                 | ---      | Underdrain                     |



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 Field Storm Sewer Plans

ISSUE:

10/17/19

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**Utility Plan**

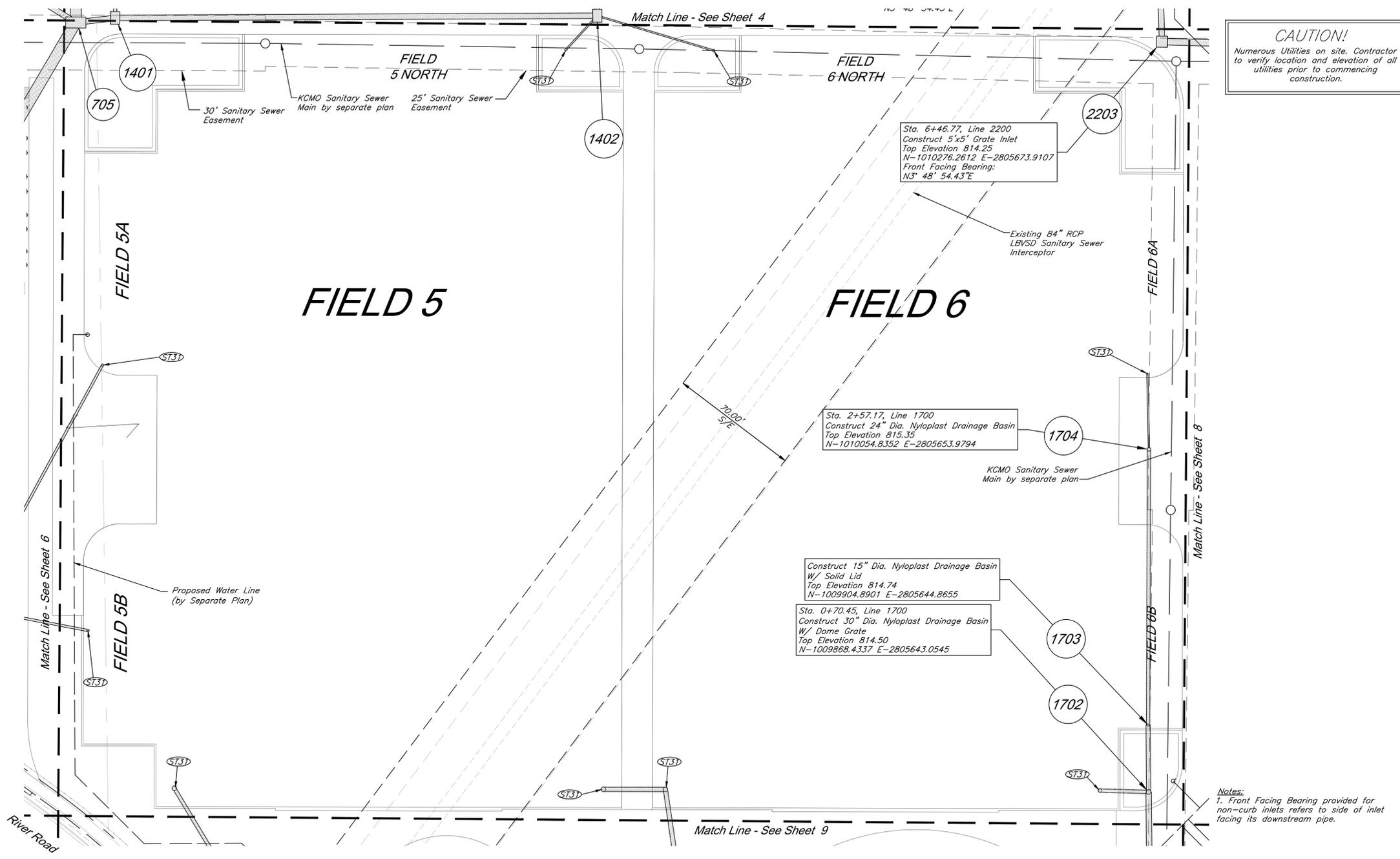
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PROJECT:

**Paragon Star Soccer Complex**  
 Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

ISSUE:

10/17/19

PROFESSIONAL SEAL:

DRAWING TITLE:

**Utility Plan**

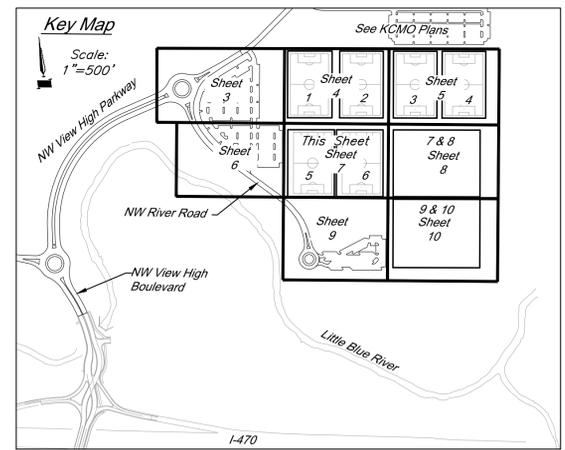
JOB NO: 1197 SCALE:

DATE: 10.03.2019 DRAWN BY: GBA

SHEET NO:

**7**

GBA PN 12720.09

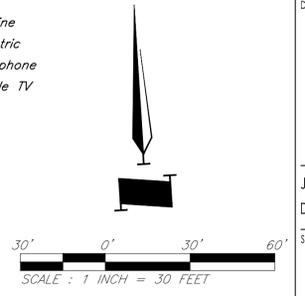


**Storm Sewer Construction Notes:**

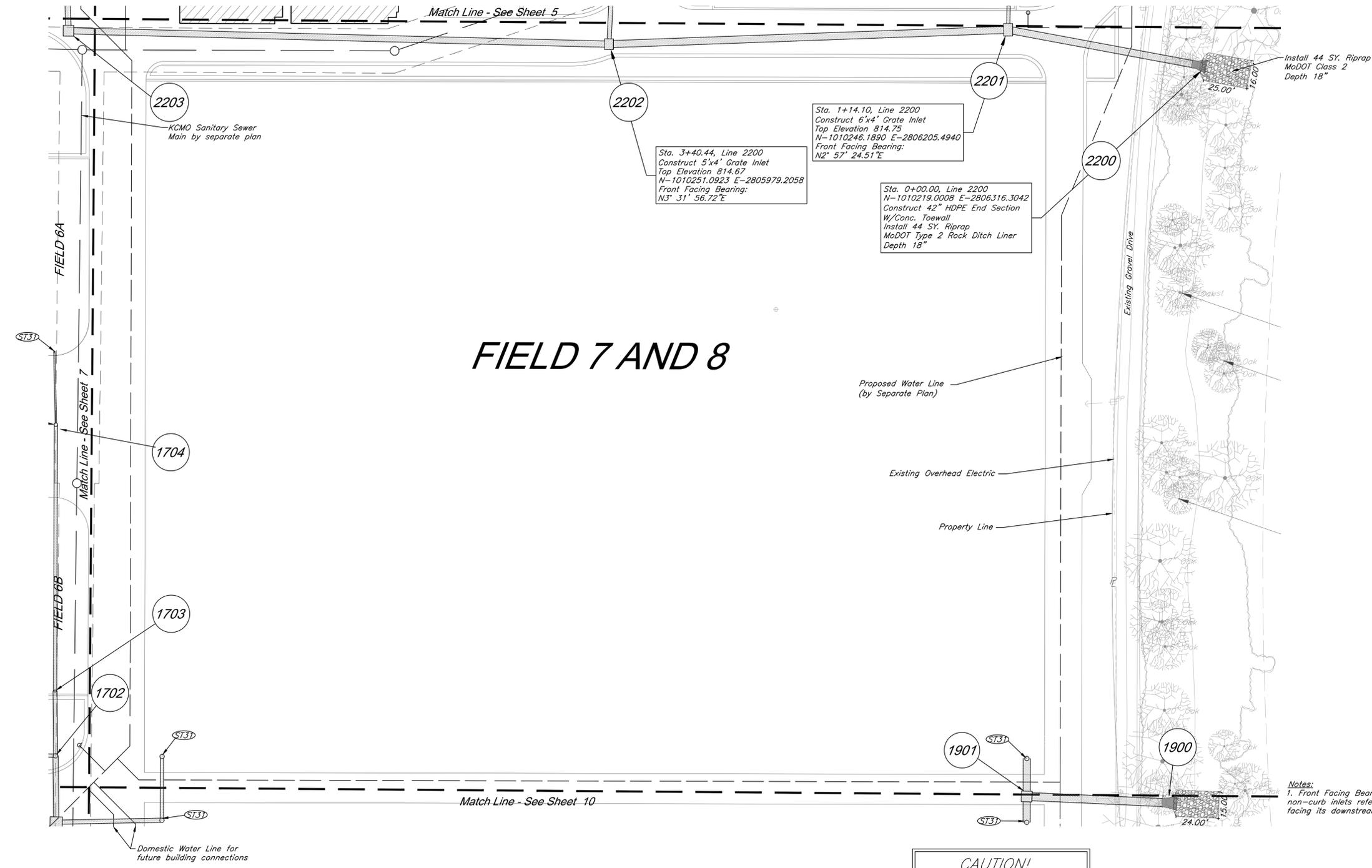
Ⓢ331 See Athletic Field Plans for field storm sewer

**Utility Legend**

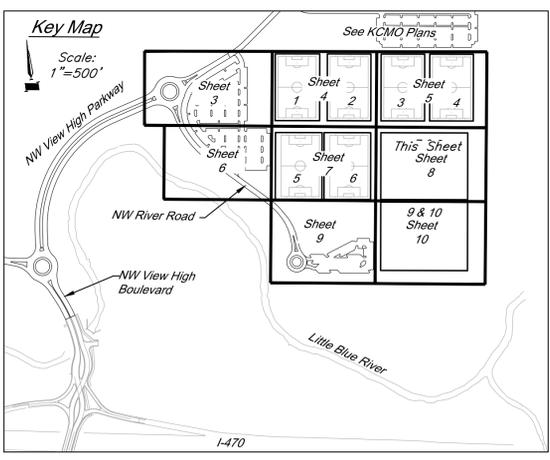
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|------|---------------------------------|------|--------------------------------|
| Ⓢ331 | Existing Cable TV Pedestal      | W.M. | Existing Water Meter           |
| Ⓢ331 | Existing Power Pole             | ---  | Existing Fiber Optic Line      |
| Ⓢ331 | Existing Guy Anchor             | ---  | Existing Fire Protection Line  |
| Ⓢ331 | Existing Electrical Manhole     | ---  | Existing Gas Line              |
| Ⓢ331 | Existing Electrical Transformer | ---  | Existing Over Head Electric    |
| Ⓢ331 | Existing Gas Meter              | ---  | Existing Over Head Telephone   |
| Ⓢ331 | Existing Curb Inlet             | ---  | Existing Over Head Cable TV    |
| Ⓢ331 | Existing Sanitary Sewer Manhole | ---  | Property Line                  |
| Ⓢ331 | Existing Sanitary Cleanout      | ---  | ROW                            |
| Ⓢ331 | Existing Light Pole             | ---  | Right-of-Way Line              |
| Ⓢ331 | Existing Boring Hole            | ---  | Existing Sanitary Sewer Line   |
| Ⓢ331 | Existing Sign                   | ---  | Existing Underground Electric  |
| Ⓢ331 | Existing Telephone Pedestal     | ---  | Existing Underground Telephone |
| Ⓢ331 | Existing Traffic Signal Post    | ---  | Existing Underground Cable TV  |
| Ⓢ331 | Existing Traffic Manhole        | ---  | Existing Water Line            |
| Ⓢ331 | Existing Fire Hydrant           | ---  | Proposed Storm Sewer           |
|      |                                 | ---  | Existing Storm Sewer           |
|      |                                 | ---  | Underdrain                     |



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# FIELD 7 AND 8

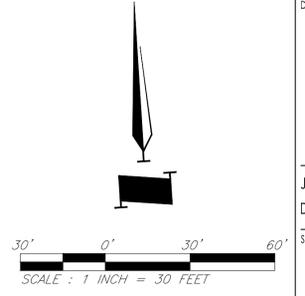


**Storm Sewer Construction Notes:**  
 (ST3) See Athletic Field Plans for field storm sewer

**CAUTION!**  
 Numerous Utilities on site. Contractor to verify location and elevation of all utilities prior to commencing construction.

**Utility Legend**

	Existing Cable TV Pedestal		Existing Water Meter
	Existing Power Pole		Existing Fiber Optic Line
	Existing Guy Anchor		Existing Fire Protection Line
	Existing Electrical Manhole		Existing Gas Line
	Existing Electrical Transformer		Existing Over Head Electric
	Existing Gas Meter		Existing Over Head Telephone
	Existing Curb Inlet		Existing Over Head Cable TV
	Existing Sanitary Sewer Manhole		Property Line
	Existing Sanitary Cleanout		Right-of-Way Line
	Existing Light Pole		Existing Sanitary Sewer Line
	Existing Boring Hole		Existing Underground Electric
	Existing Sign		Existing Underground Telephone
	Existing Telephone Pedestal		Existing Undergrnd Cable TV
	Existing Traffic Signal Post		Existing Water Line
	Existing Traffic Manhole		Proposed Storm Sewer
	Existing Fire Hydrant		Existing Storm Sewer
			Underdrain



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PROJECT:  
**Paragon Star Soccer Complex**  
 Soccer Complex Storm Sewer  
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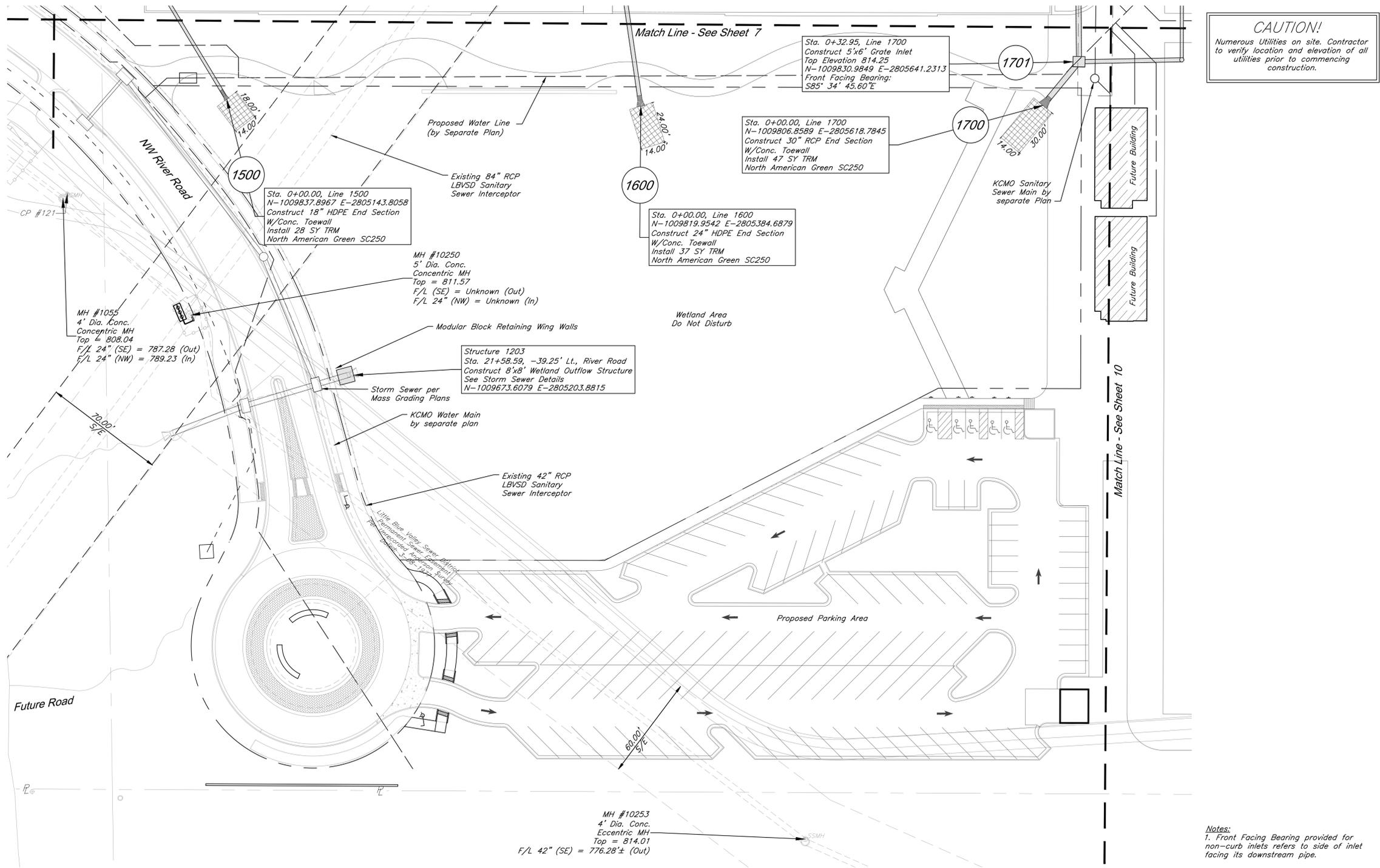
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DRAWING TITLE:  
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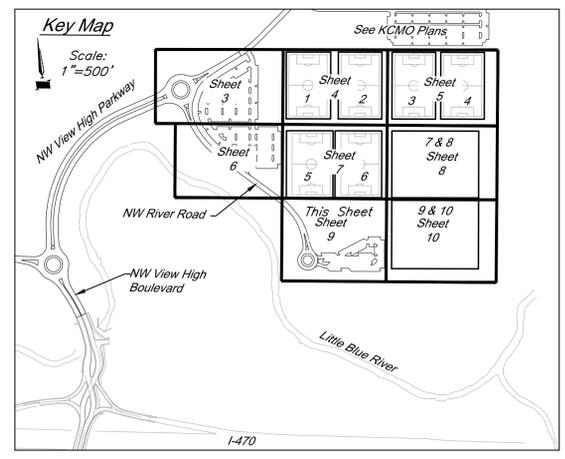
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 DATE: 10.03.2019 DRAWN BY: GBA

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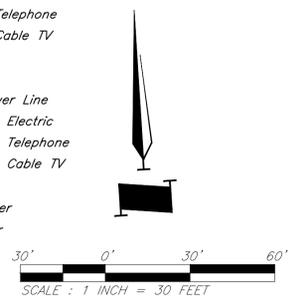
**CAUTION!**  
 Numerous Utilities on site. Contractor to verify location and elevation of all utilities prior to commencing construction.



**Utility Legend**

	Existing Cable TV Pedestal		Existing Water Meter
	Existing Power Pole		Existing Fiber Optic Line
	Existing Guy Anchor		Existing Fire Protection Line
	Existing Electrical Manhole		Existing Gas Line
	Existing Electrical Transformer		Existing Over Head Electric
	Existing Gas Meter		Existing Over Head Telephone
	Existing Curb Inlet		Existing Over Head Cable TV
	Existing Sanitary Sewer Manhole		Property Line
	Existing Sanitary Cleanout		Right-of-Way Line
	Existing Light Pole		Existing Sanitary Sewer Line
	Existing Boring Hole		Existing Underground Electric
	Existing Sign		Existing Underground Telephone
	Existing Telephone Pedestal		Existing Underground Cable TV
	Existing Traffic Signal Post		Existing Water Line
	Existing Traffic Manhole		Proposed Storm Sewer
	Existing Fire Hydrant		Existing Storm Sewer
			Underdrain

**Notes:**  
 1. Front Facing Bearing provided for non-curb inlets refers to side of inlet facing its downstream pipe.



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PROJECT:

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 Soccer Complex Storm Sewer  
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 Field Storm Sewer Plans

ISSUE:

10/17/19

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DRAWING TITLE:

**Utility Plan**

JOB NO: 1197 SCALE:

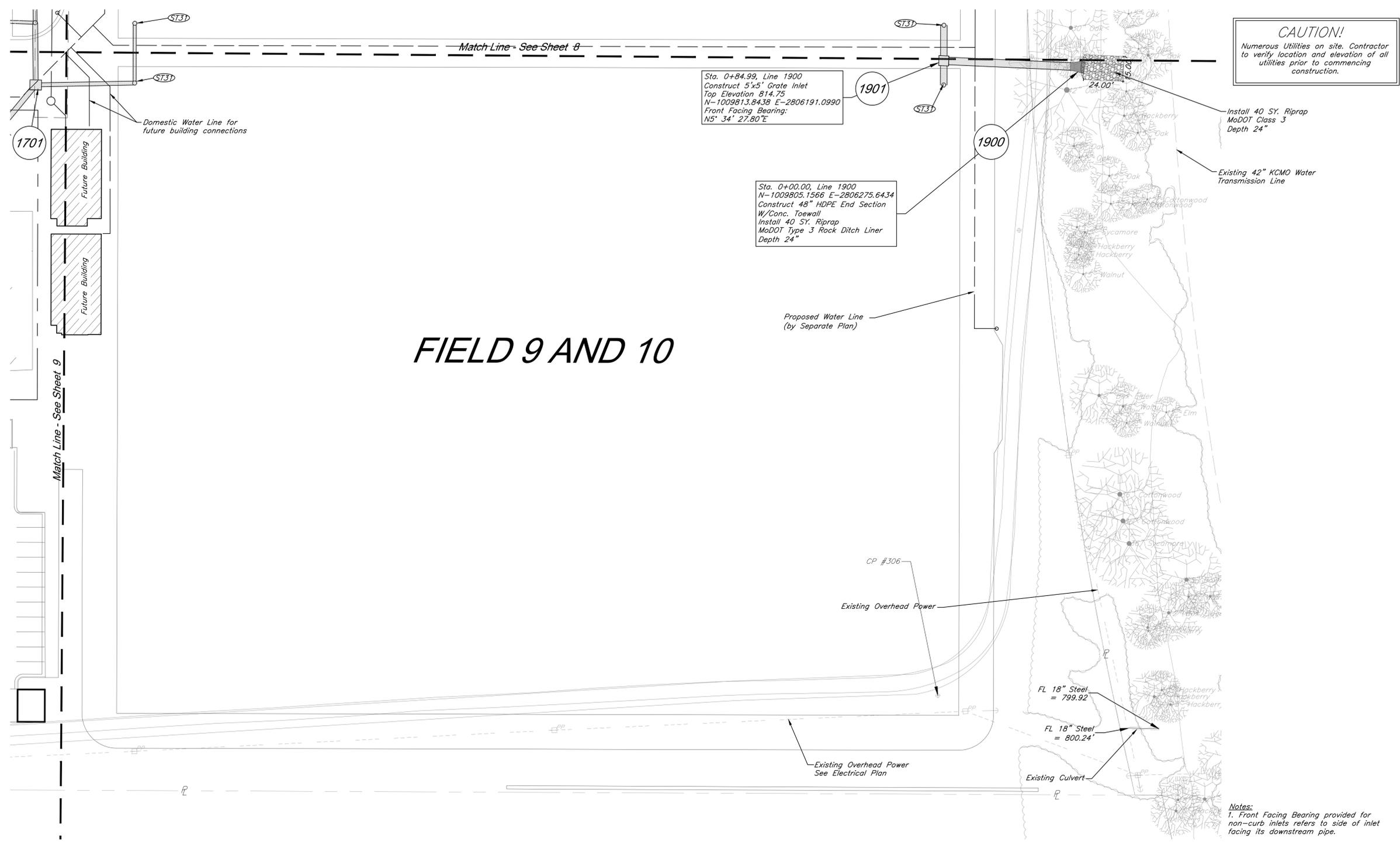
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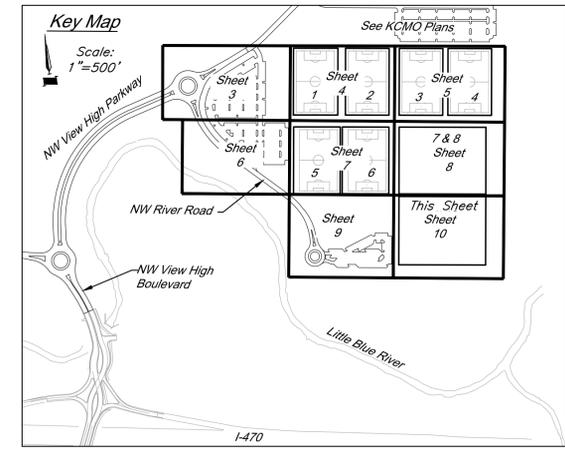


**CAUTION!**  
 Numerous Utilities on site. Contractor to verify location and elevation of all utilities prior to commencing construction.

Sta. 0+84.99, Line 1900  
 Construct 5'x5' Grate Inlet  
 Top Elevation 814.75  
 N-1009813.8438 E-2806191.0990  
 Front Facing Bearing:  
 N5° 34' 27.80"E

Sta. 0+00.00, Line 1900  
 N-1009805.1566 E-2806275.6434  
 Construct 48" HDPE End Section  
 W/Conc. Toewall  
 Install 40 SY. Riprap  
 MoDOT Type 3 Rock Ditch Liner  
 Depth 24"

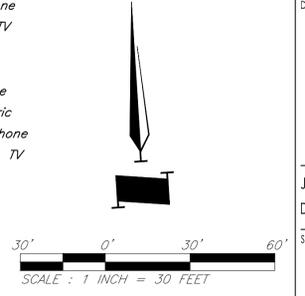
# FIELD 9 AND 10



**Storm Sewer Construction Notes:**  
 (ST3) See Athletic Field Plans for field storm sewer

Utility Legend	
	Existing Cable TV Pedestal
	Existing Power Pole
	Existing Guy Anchor
	Existing Electrical Manhole
	Existing Electrical Transformer
	Existing Gas Meter
	Existing Curb Inlet
	Existing Sanitary Sewer Manhole
	Existing Sanitary Cleanout
	Existing Light Pole
	Existing Boring Hole
	Existing Sign
	Existing Telephone Pedestal
	Existing Traffic Signal Post
	Existing Traffic Manhole
	Existing Fire Hydrant
	Existing Water Meter
	Existing Fiber Optic Line
	Existing Fire Protection Line
	Existing Gas Line
	Existing Over Head Electric
	Existing Over Head Telephone
	Existing Over Head Cable TV
	Property Line
	Right-of-Way Line
	Existing Sanitary Sewer Line
	Existing Underground Electric
	Existing Underground Telephone
	Existing Underground Cable TV
	Existing Water Line
	Proposed Storm Sewer
	Existing Storm Sewer
	Underdrain

**Notes:**  
 1. Front Facing Bearing provided for non-curb inlets refers to side of inlet facing its downstream pipe.



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**Paragon Star Soccer Complex**  
 Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

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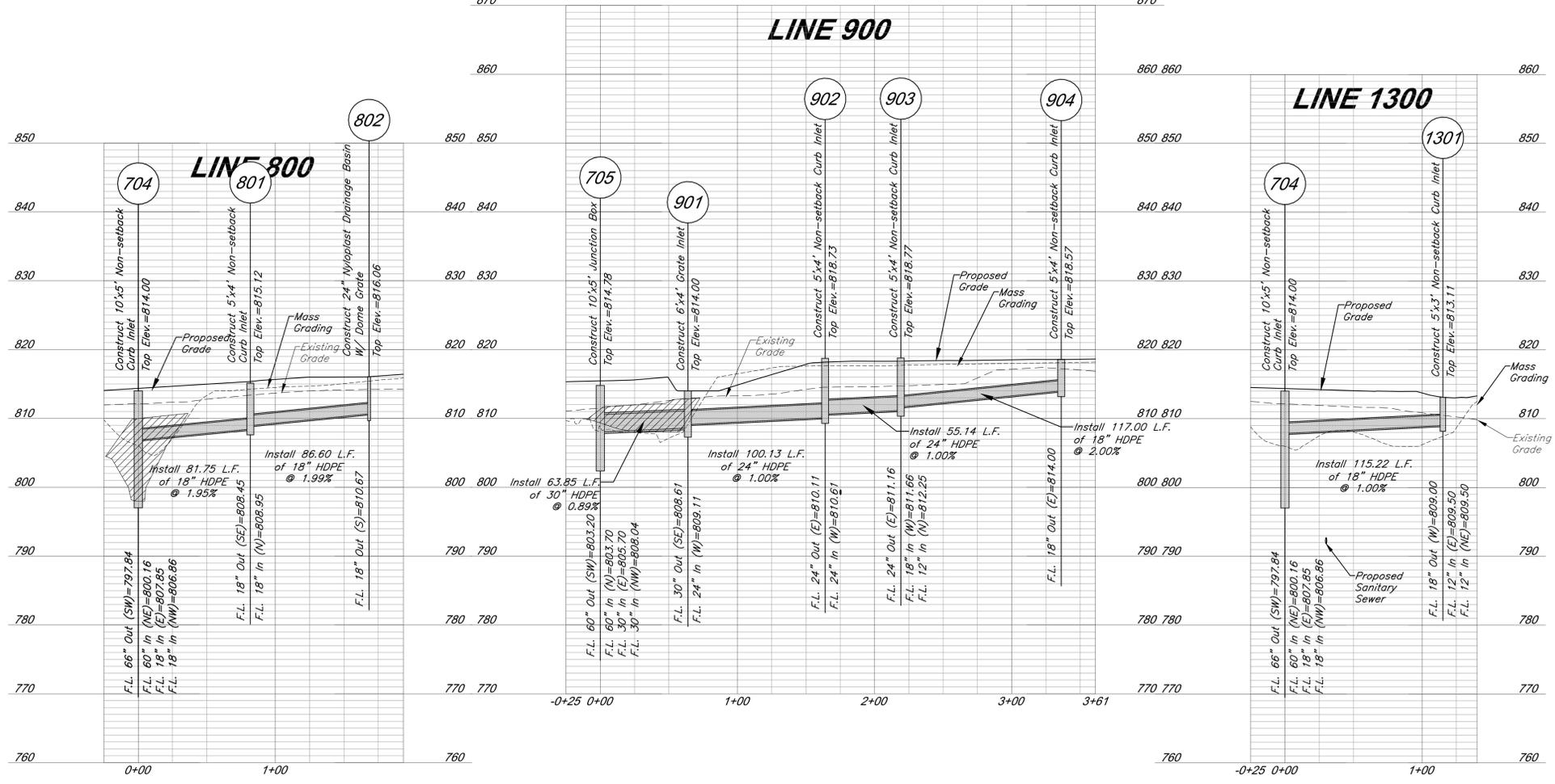
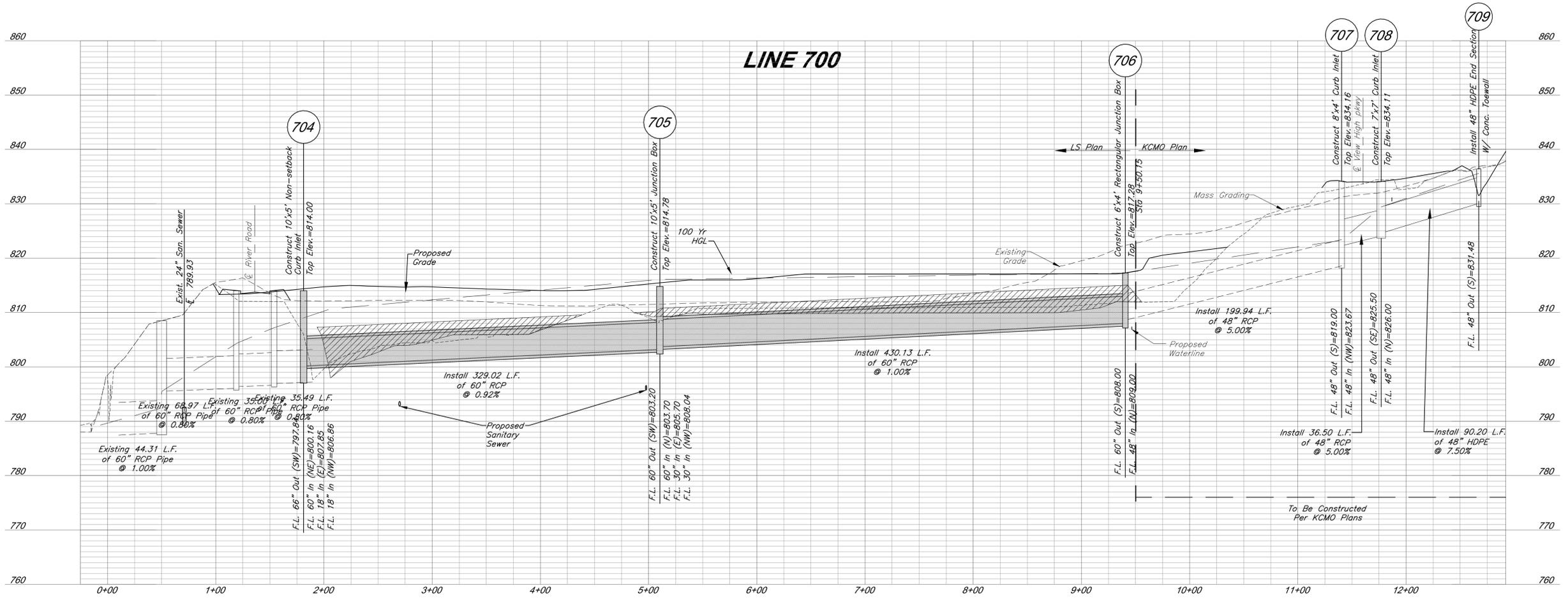


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**Utility Plan**

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 DATE: 10.03.2019 DRAWN BY: GBA

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**LEGEND**

Compacted Fill shall be placed to a minimum of 18 inches above the top of pipe prior to installation.

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 Vertical Scale: 1" = 10'

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PROJECT:

# Paragon Star Soccer Complex

Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

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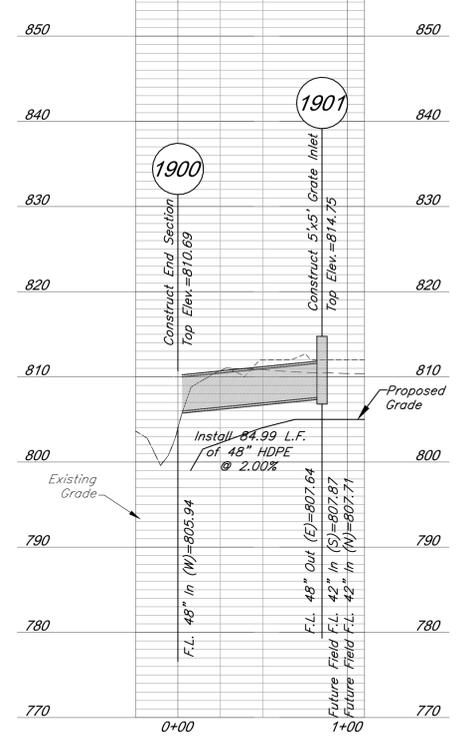
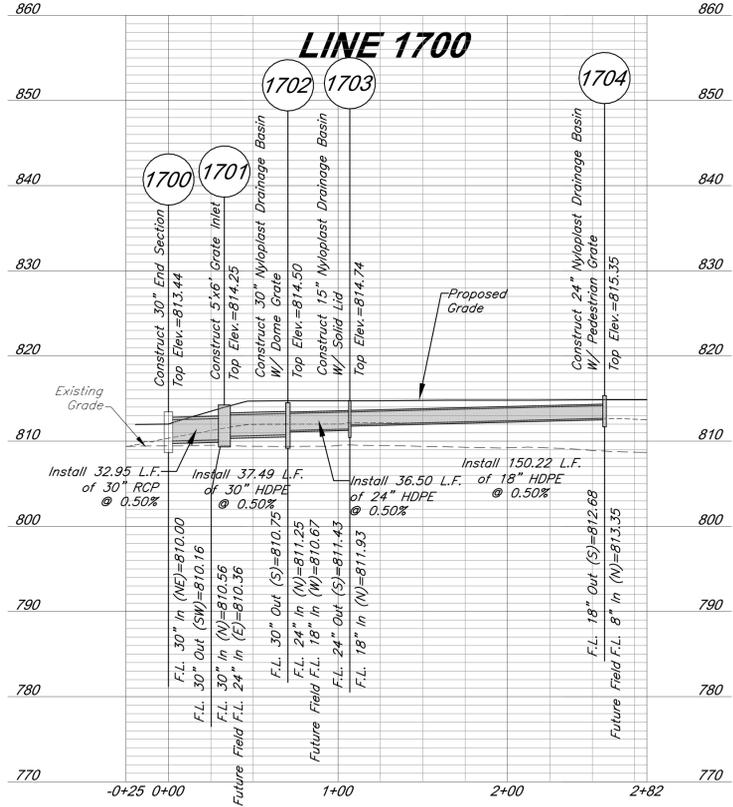
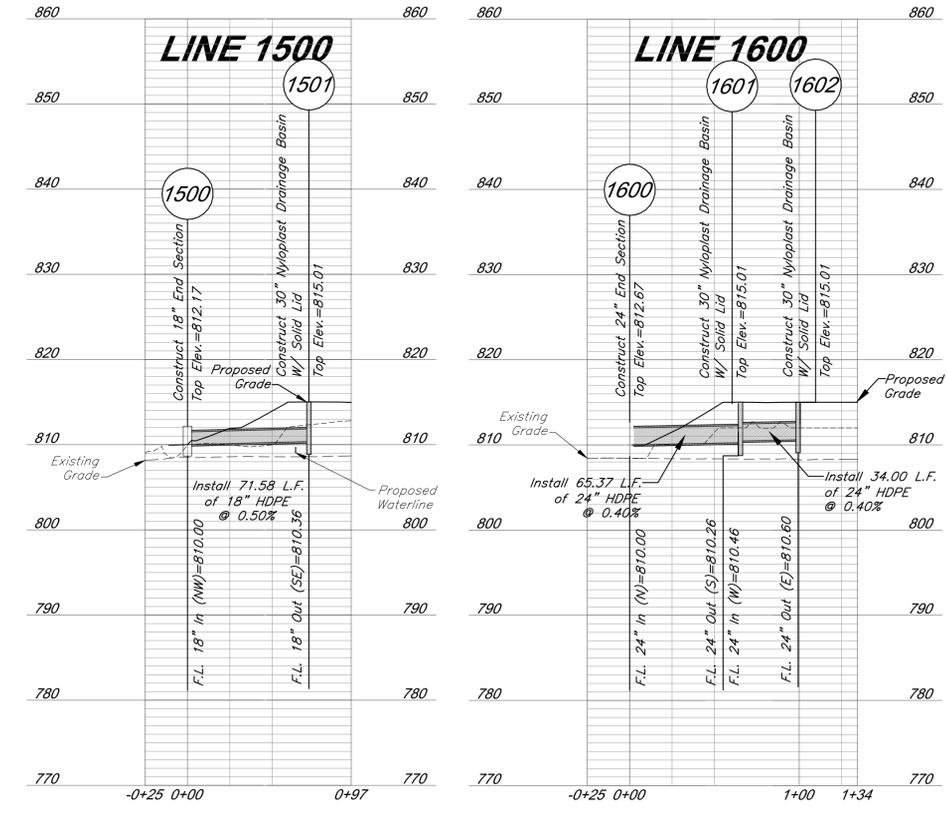
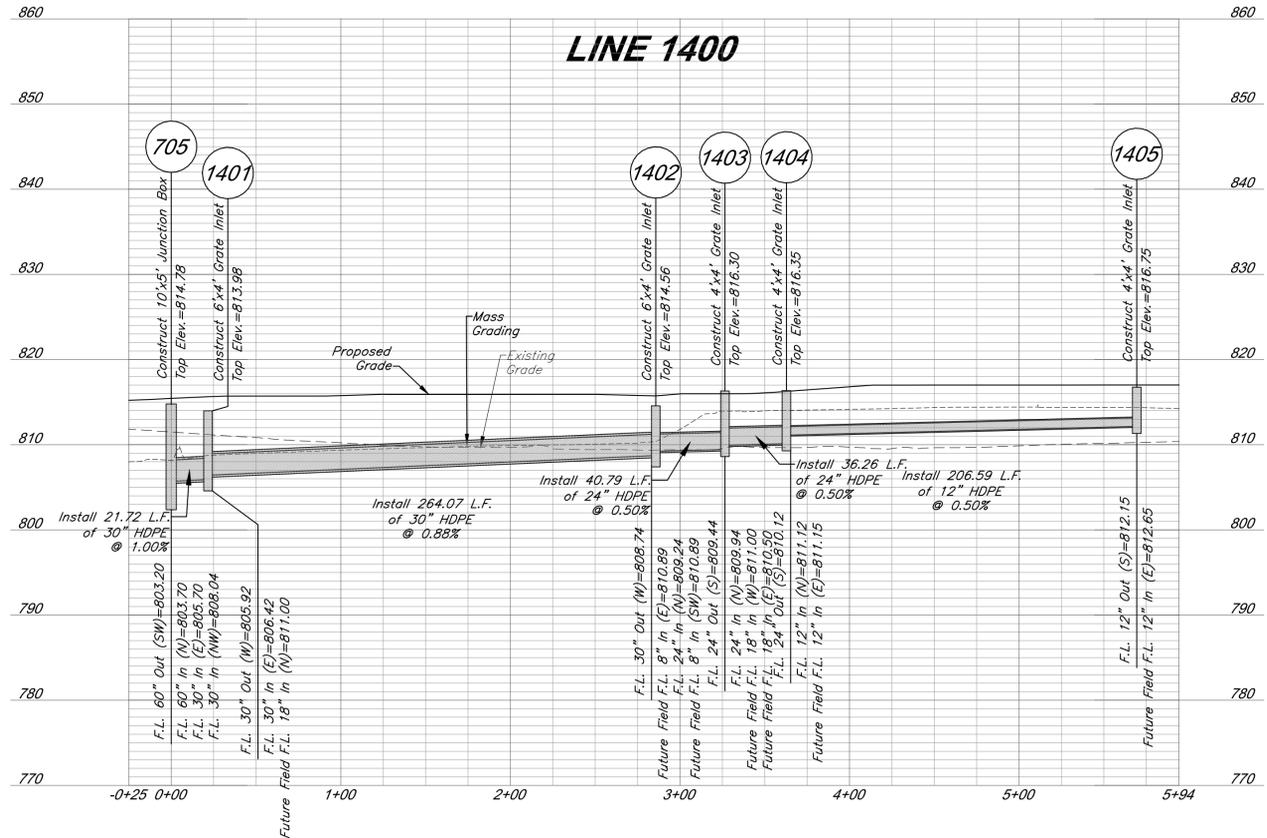
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## Storm Sewer Profiles

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**LEGEND**

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PROJECT:

# Paragon Star Soccer Complex

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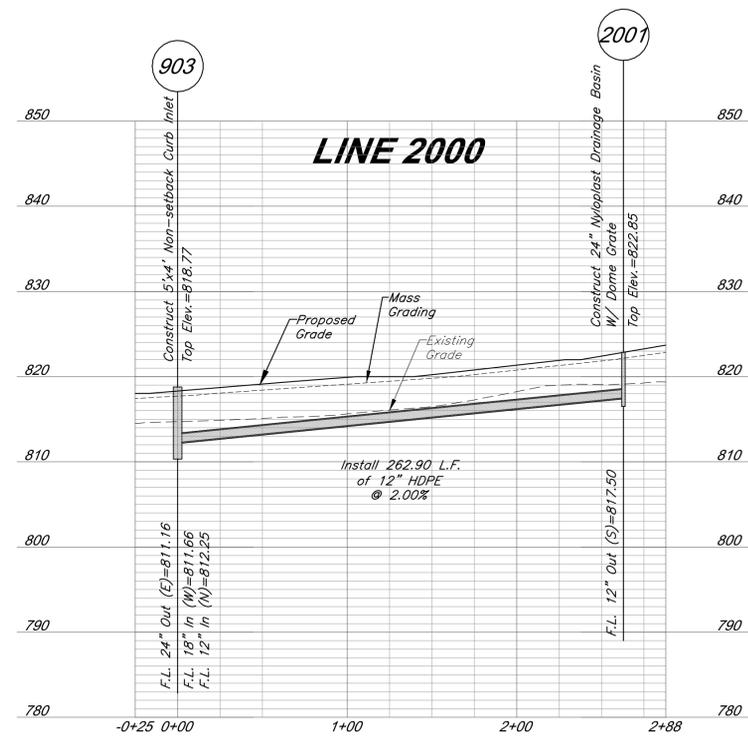
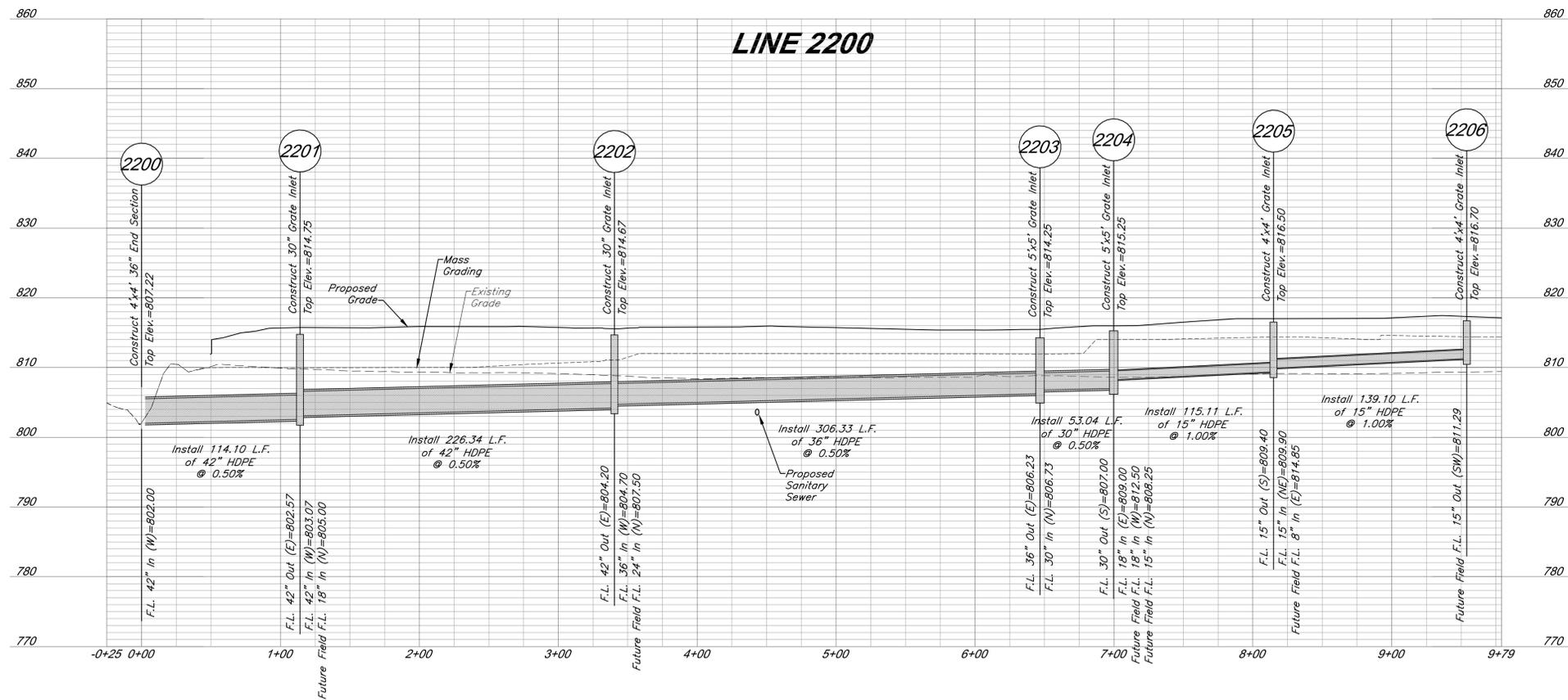
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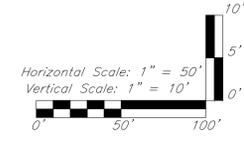
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Note: Compacted Fill shall be placed to a minimum of 18 inches above the top of pipe prior to installation.



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PROJECT:

# Paragon Star Soccer Complex

Soccer Complex Storm Sewer  
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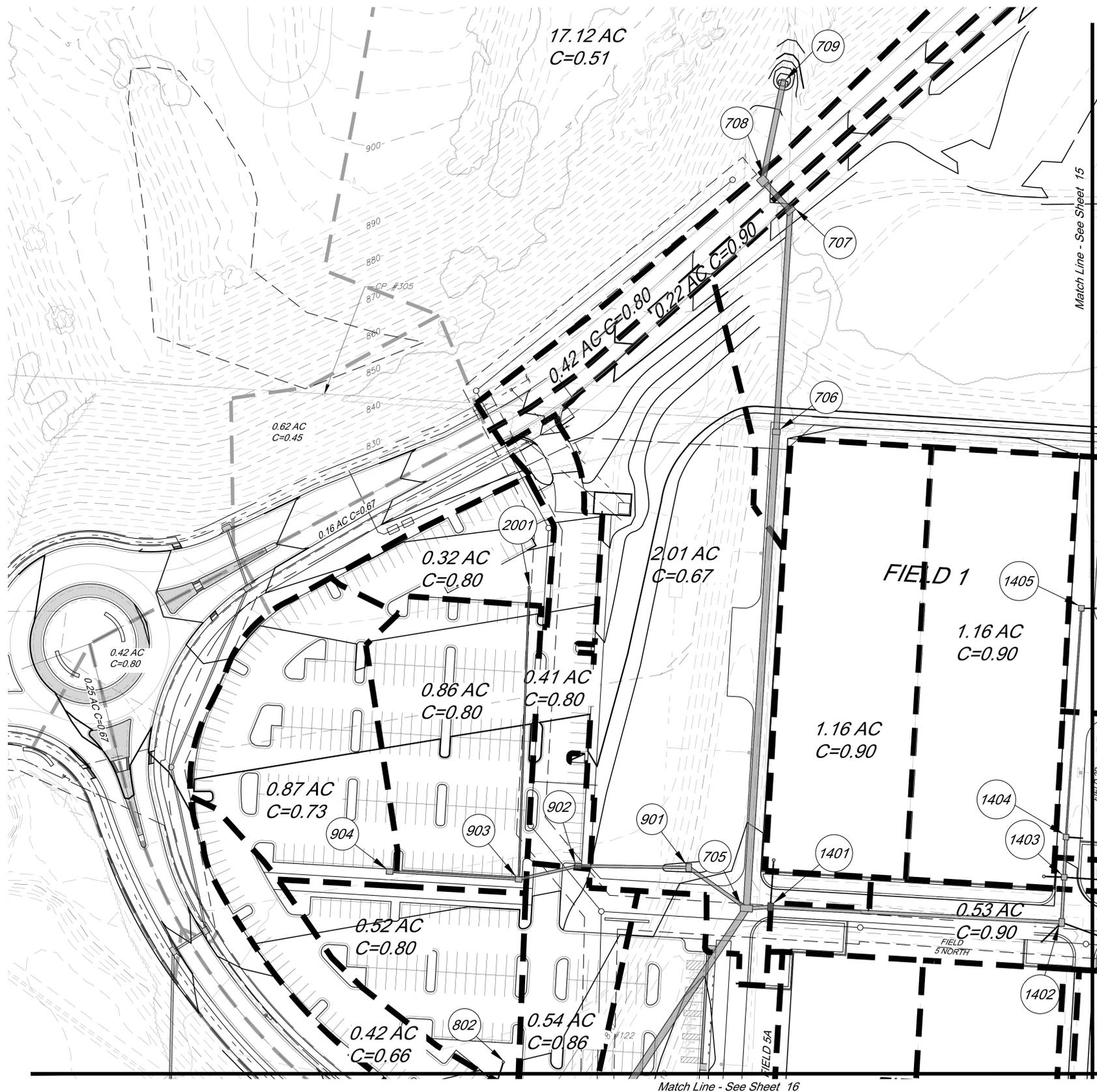
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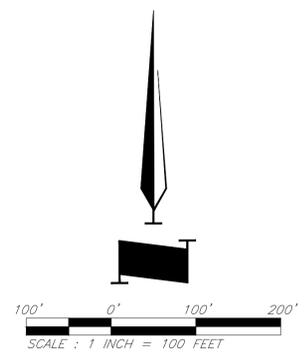
## Storm Sewer Profiles

JOB NO: 1197 SCALE:  
 DATE: 10.03.2019 DRAWN BY: GBA  
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- Legend**
- 800 Proposed Contours
  - 800 Existing Contour
  - Proposed Drainage Area
  - 0.28 Acres Drainage Area
  - Proposed Storm Sewer
  - Future Storm Sewer



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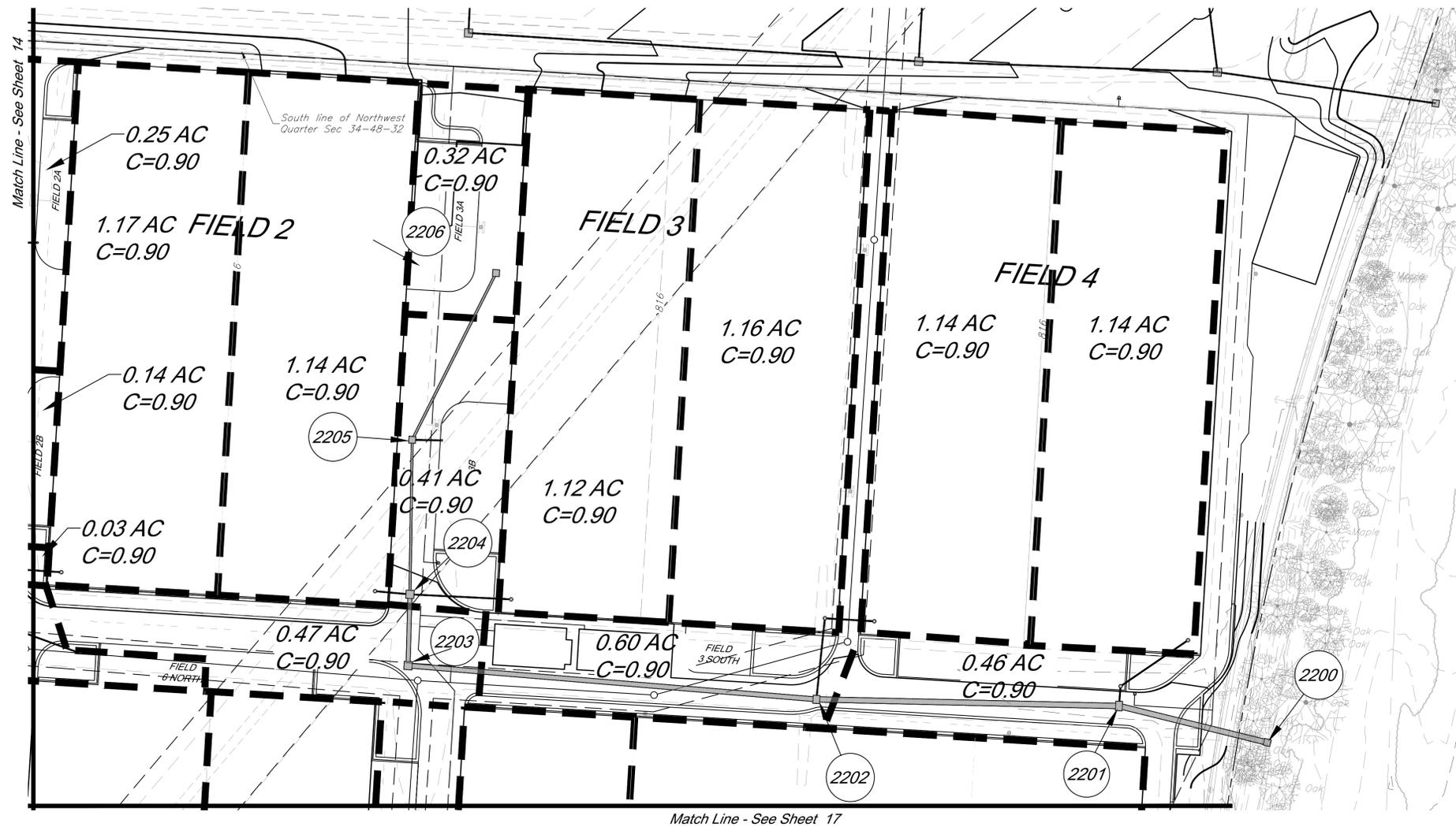
## Drainage Map

JOB NO: 1197 SCALE:

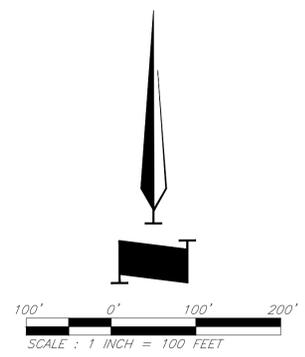
DATE: 10.03.2019 DRAWN BY: GBA

SHEET NO:

G:\12720\Civil\3D\Production Drawings\Field Storm Plans\12720C2000.dwg Layout: 15 Drainage Map -- Thursday, October 17, 2019, 3:21pm -- Copyright 2019, George Butler Associates, Inc. Architect 00212, Professional Engineer 000133, Professional Land Surveyor 000059  
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- Legend**
- 800 Proposed Contours
  - 800 Existing Contour
  - Proposed Drainage Area
  - 0.28 Acres Drainage Area
  - Proposed Storm Sewer
  - Future Storm Sewer



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PROJECT:

**Paragon Star Soccer Complex**  
 Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

ISSUE:

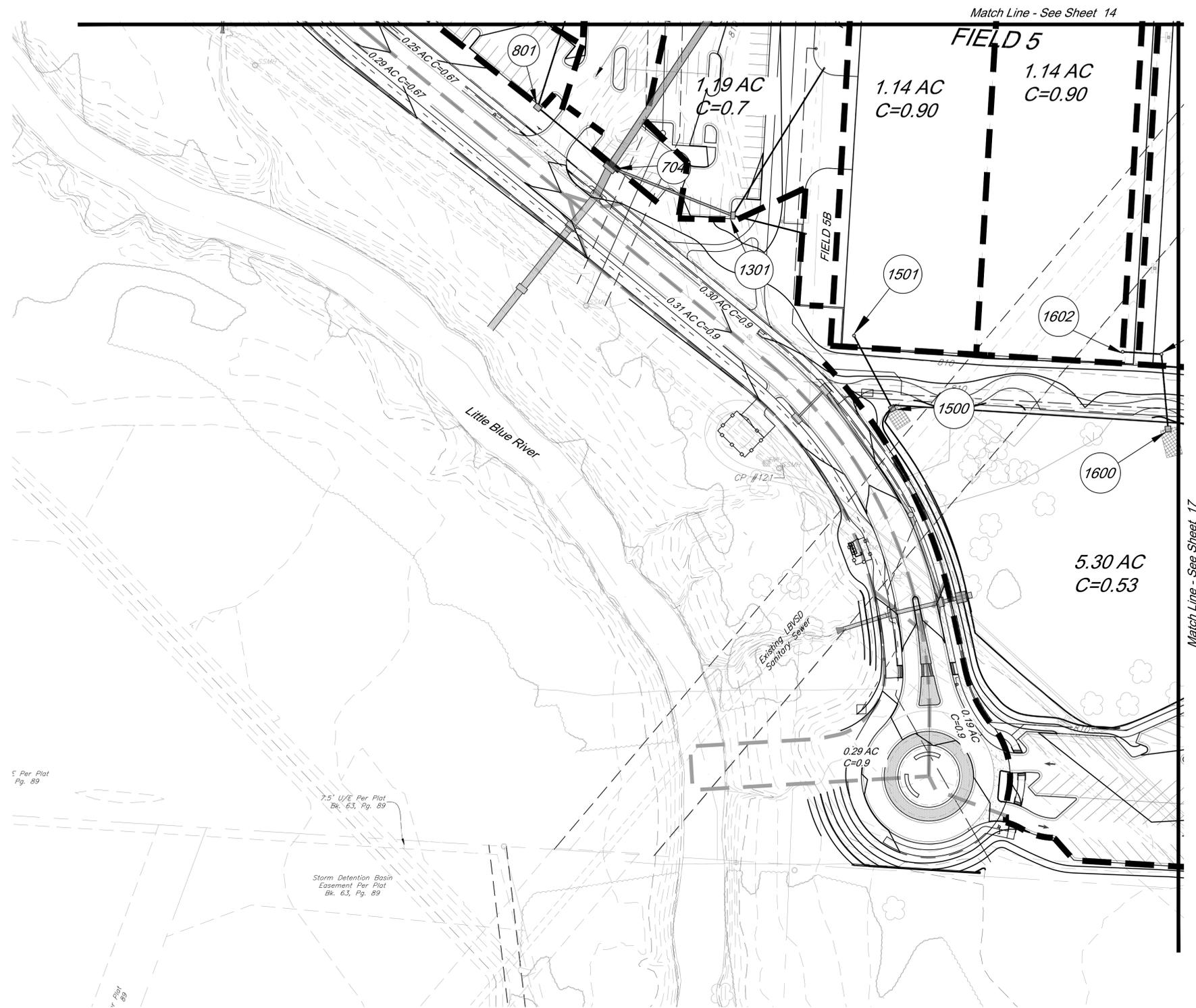
10/17/19



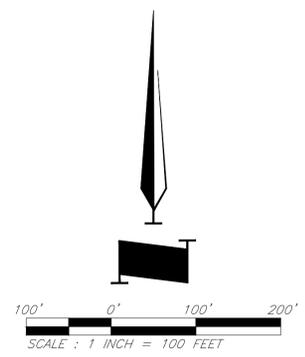
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**Drainage Map**

JOB NO: 1197 SCALE:  
 DATE: 10.03.2019 DRAWN BY: GBA  
 SHEET NO:

G:\12720\01\Production Drawings\Field Storm Plans\12720C2000.dwg    Layout: 16 Drainage Map    --    Thursday, October 17, 2019, 3:22pm    --    Copyright 2019, George Butler Associates, Inc.    Architect: 00212, Professional Engineer 000133, Professional Land Surveyor 000059  
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- Legend**
- Proposed Contours
  - Existing Contour
  - Proposed Drainage Area
  - Drainage Area
  - Proposed Storm Sewer
  - Future Storm Sewer



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PROJECT:

# Paragon Star Soccer Complex

Soccer Complex Storm Sewer  
1401 NW View High Dr, Lee's Summit, MO 64081  
Field Storm Sewer Plans

ISSUE:

10/17/19



DRAWING TITLE:

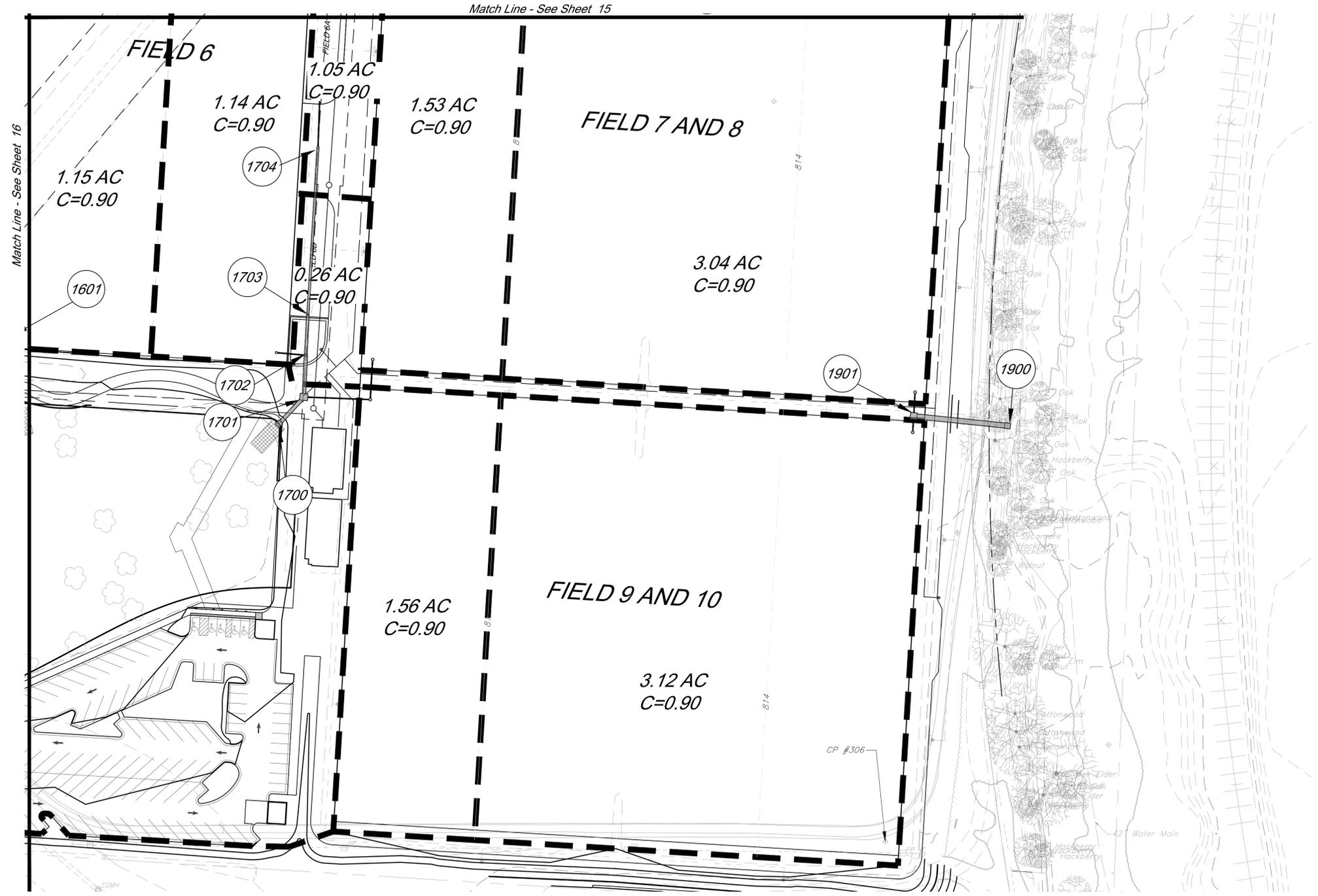
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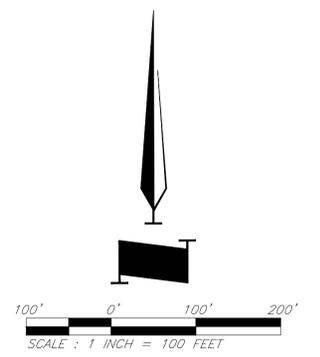
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- Legend**
- Proposed Contours
  - Existing Contour
  - Proposed Drainage Area
  - 0.28 Acres Drainage Area
  - Proposed Storm Sewer
  - Future Storm Sewer



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PROJECT:

# Paragon Star Soccer Complex

Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081

Field Storm Sewer Plans

ISSUE:

10/17/19



DRAWING TITLE:

## Drainage Map

JOB NO: 1197 SCALE:

DATE: 10.03.2019 DRAWN BY: GBA

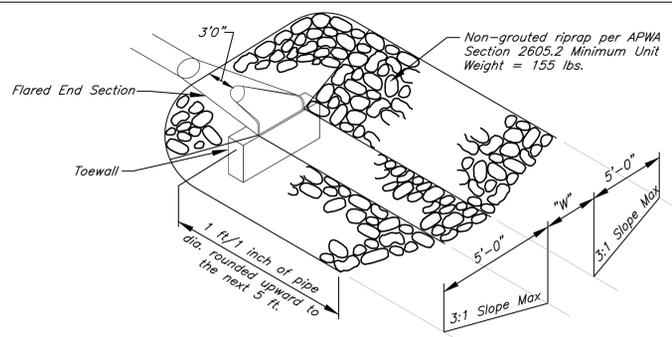
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25 Year Storm Preliminary - Subject to Change Upon Final Design										Indicates Future Storm Sewer										Indicates Storm for Fields																
Structures		Runoff Calculations								Pipe Design						Design Checks						Comments														
From	To	Direct Area (acre)	Line In (acre)	Total Area (acre)	C	K	Tc (min)	Flow Time (min)	Intensity (in/hr)	Design Q (cfs)	Area Inlet Headwater (in)	Description	Pipe length (lin ft)	Pipe Slope, %	Pipe dia (in)	Manning's n Value	Q full (cfs)	Pipe Area, sf	V full fps	Design V fps	Hw/D		outlet head, H	HW, Inlet Control, (ft)	HW, Outlet Control, (ft)	Inlet Top Elevation	upstream flowline	downstream flowline	Invert Drop (ft)	Downstream water elevation	Hydraulic Grade Elev. (Calculated)	Hydraulic Grade (allowable)				
Line 700 (100 Yr)	709	708	17.12		0.51	1.25	18.92		6.61	72.2		End Section																								
					0.51	1.25	18.92	0.07	6.61	72.2		RCP	90.20	6.08	48	0.013	355.14	12.57	28.26	20.62	1.0	1.12	834.49	829.72	N/A	830.50	825.01		828.60	834.49	836.00					
	708	707	0.42		0.80	1.25	5.50		10.12	4.2		Curb Inlet																								
					0.80	1.25	5.50	0.03	6.60	74.8		RCP	36.50	5.00	48	0.013	322.06	12.57	25.63	20.84	1.0	0.88	828.60	824.05	834.22	824.51	822.69	0.5	823.17	828.60	832.39					
	707	706	0.22		0.90	1.25	6.21		9.84	2.4		Curb Inlet																								
					0.90	1.25	6.21	0.16	6.59	76.4		RCP	199.94	5.00	48	0.013	322.06	12.57	25.63	20.84	1.0	1.94	823.17	813.91	834.16	819.02	809.02	3.67	811.97	823.17	832.33					
	706	705	0.00		0.80	1.25	5.00		10.32	0.0		Junction Box																								
					0.80	1.25	5.00	0.62	6.57	76.1		RCP	430.13	1.00	60	0.013	261.14	19.63	13.30	11.60	0.8	1.09	811.97	809.55	817.47	808.02	803.72	1	808.46	811.97	815.64					
	705	704	0.00	8.88	0.87	1.25	5.85		8.98	0.0		Curb Inlet																								
					0.87	1.25	5.85	0.35	6.46	135.2		RCP	304.65	1.00	60	0.013	261.14	19.63	13.30	14.43	1.0	2.70	808.46	807.88	814.1	803.22	800.17	2.3	805.18	808.46	813.45					
704	703	0.54	2.13	0.86	1.25	5.00		10.32	6.0		Curb Inlet																									
				0.86	1.25	5.00	0.06	6.41	150.0		RCP	51.87	0.80	60	0.013	233.57	19.63	11.90	14.78	1.1	1.47	803.53	805.18	813.98	797.85	797.44	0.3	803.71	803.53	812.77						
703	702	0.25		0.90	1.25	5.00		10.32	2.9		Curb Inlet																									
				0.90	1.25	5.00	0.04	6.40	151.5		RCP	35.00	0.80	60	0.013	233.57	19.63	11.90	14.80	1.1	1.37	802.86	803.71	813.98	797.14	796.86	0.3	802.34	802.86	812.15						
702	701	0.29		0.90	1.25	5.00		10.32	3.4		Curb Inlet																									
				0.90	1.25	5.00	0.08	6.39	153.5		RCP	68.97	0.80	60	0.013	233.57	19.63	11.90	14.84	1.2	1.67	802.34	794.83	813.98	796.56	796.01	0.3	793.16	802.34	807.15						
701	700	0.00		0.90	1.25	5.00		10.32	0.0		Junction Box																									
				0.90	1.25	5.00	0.06	6.39	153.5		RCP	56.70	1.00	60	0.013	261.14	19.63	13.30	14.84	1.2	1.57	793.16	790.88	808.48	787.38	786.81	8.63	789.31	793.16	807.15						
Line 700 (25 Yr)	709	708	17.12		0.51	1.10	18.92		5.38	51.7		End Section																								
					0.51	1.10	18.92	0.07	5.38	51.7		RCP	90.20	6.08	48	0.013	355.14	12.57	28.26	20.62	0.8	0.57	833.85	828.49	N/A	830.50	825.01		827.92	833.85	836.00					
	708	707	0.42		0.80	1.10	5.50		8.35	3.1		Curb Inlet																								
					0.80	1.10	5.50	0.03	5.37	53.6		RCP	36.50	5.00	48	0.013	322.06	12.57	25.63	20.84	0.9	0.45	827.92	822.90	834.22	824.51	822.69	0.5	822.45	827.92	832.39					
	707	706	0.22		0.90	1.10	6.21		8.12	1.8		Curb Inlet																								
					0.90	1.10	6.21	0.16	5.37	54.7		RCP	199.94	5.00	48	0.013	322.06	12.57	25.63	20.84	0.9	0.99	822.45	812.67	834.16	819.02	809.02	3.67	811.68	822.45	832.33					
	706	705	0.00		0.80	1.10	5.00		8.53	0.0		Junction Box																								
					0.80	1.10	5.00	0.62	5.34	54.5		RCP	430.13	1.00	60	0.013	261.14	19.63	13.30	11.60	0.7	0.56	811.68	808.10	817.47	808.02	803.72	1	807.54	811.68	815.64					
	705	704	0.00	8.88	0.67	1.10	5.85		8.24	0.0		Curb Inlet																								
					0.67	1.10	5.85	0.35	5.26	96.8		RCP	304.65	1.00	60	0.013	261.14	19.63	13.30	14.43	0.9	1.38	807.54	803.99	814.1	803.22	800.17	2.3	802.61	807.54	813.45					
704	703	0.54	2.13	0.86	1.10	5.00		8.53	4.4		Curb Inlet																									
				0.86	1.10	5.00	0.06	5.21	107.3		RCP	51.87	0.80	60	0.013	233.57	19.63	11.90	14.78	0.9	0.75	802.39	802.61	813.98	797.85	797.44	0.3	801.86	802.39	812.15						
703	702	0.25		0.90	1.10	5.00		8.53	2.1		Curb Inlet																									
				0.90	1.10	5.00	0.04	5.20	108.5		RCP	35.00	0.80	60	0.013	233.57	19.63	11.90	14.80	0.9	0.70	801.70	801.86	813.98	797.14	796.86	0.3	801.16	801.70	812.15						
702	701	0.29		0.90	1.10	5.00		8.53	2.4		Curb Inlet																									
				0.90	1.10	5.00	0.08	5.20	109.8		RCP	68.97	0.80	60	0.013	233.57	19.63	11.90	14.84	0.9	0.85	801.16	792.83	813.98	796.56	796.01	0.3	791.97	801.16	812.15						
701	700	0.00		0.90	1.10	5.00		8.53	0.0		Junction Box																									
				0.90	1.10	5.00	0.06	5.20	109.8		RCP	56.70	1.00	60	0.013	261.14	19.63	13.30	14.84	0.9	0.81	791.97	790.12	808.48	787.38	786.81	8.63	789.31	791.97	807.15						
Line 800	802	801	0.52		0.80	1.10	5.00		8.53	3.9	4.1	Dome Area Inlet																								
					0.80	1.10	5.00	0.16	8.53	3.9		HDPE	86.60	1.99	18	0.01	19.32	1.77	10.93	9.07	0.8	0.35	811.88	810.35	816.06	810.68	808.95	0.5	809.99	811.88	814.73					
	801	704	0.42		0.66	1.10	5.00		8.35	2.5		Curb Inlet																								
				0.66	1.10	5.00	0.13	8.47	8.5		HDPE	81.75	1.95	18	0.01	19.12	1.77	10.82	10.64	1.0	0.93	809.99	808.54	815.12	808.45	806.86	0.5	807.61	809.99	813.79						
				0.94	1.10	5.16		8.36	32.3		HDPE	81.75	1.95	18	0.01	19.12	1.77	10.82	10.64	1.0	0.93	809.99	808.54	815.12	808.45	806.86	0.5	807.61	809.99	813.79						
				0.94	1.10	5.16		8.36	32.3		HDPE	81.75	1.95	18	0.01	19.12	1.77	10.82	10.64	1.0	0.93	809.99	808.54	815.12	808.45	806.86	0.5	807.61	809.99	813.79						
				0.94	1.10	5.16		8.36	32.3		HDPE	81.75	1.95	18	0.01	19.12	1.77	10.82	10.64	1.0	0.93	809.99	808.54	815.12												

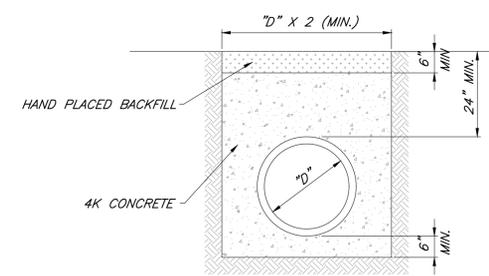


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## OUTLET EROSION PROTECTION - RIPRAP

Not to Scale



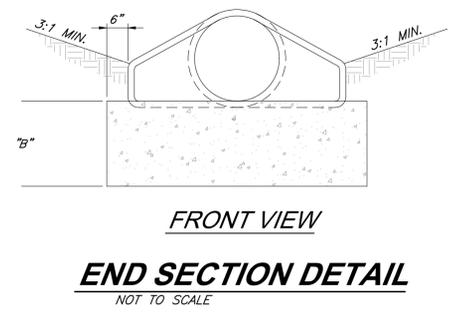
### CONCRETE ENCASEMENT CLASS A

- NOTES:
1. GRANULAR FILL SHALL BE 1/2" CLEAN ROCK, PLACED IN 6" LIFTS AND COMPACTED BY SLICING WITH A SHOVEL.
  2. TAMPED FILL SHALL BE FINELY DIVIDED, JOB EXCAVATED MATERIAL FREE OF DEBRIS, ORGANIC MATERIAL, AND STONES, COMPACTED TO TYPE AA MR-5 COMPACTION.
  3. HAND PLACED FILL SHALL BE FINELY DIVIDED MATERIAL, FREE OF DEBRIS AND STONES, COMPACTED TO TYPE AA MR-5 COMPACTION.
  4. ALL PIPE SHALL BE INSPECTED PRIOR TO BACKFILL. ALL PIPE COVERED PRIOR TO INSPECTION SHALL BE UNCOVERED AT THE CONTRACTORS EXPENSE.

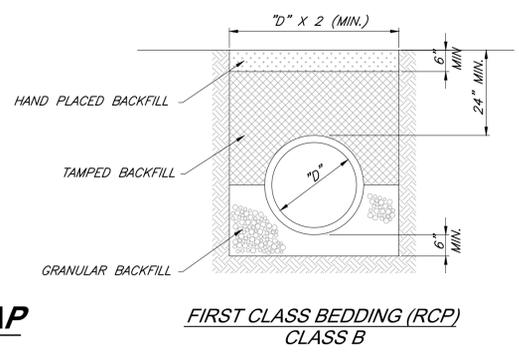
### END SECTION NOTES:

1. THE DEPTH OF THE TOE WALL SHALL BE PER TABLE. IF BEDROCK IS ENCOUNTERED A MINIMUM OF 12" INTO BEDROCK IS REQUIRED.
2. ALL CONCRETE SHALL BE KOMMB-4K.

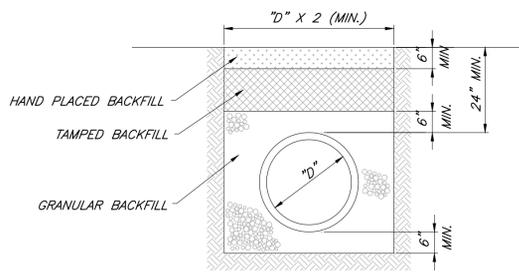
TOE WALL DEPTH	PIPE DIAMETER	"b"
12" - 21"	18"	
24" - 48"	24"	
54" - 66"	36"	



### END SECTION DETAIL NOT TO SCALE



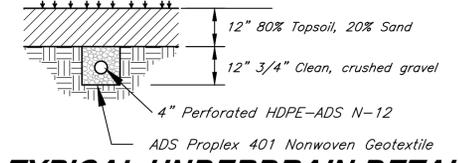
### FIRST CLASS BEDDING (RCP) CLASS B



### HDPE/PVC PIPE BEDDING CLASS C

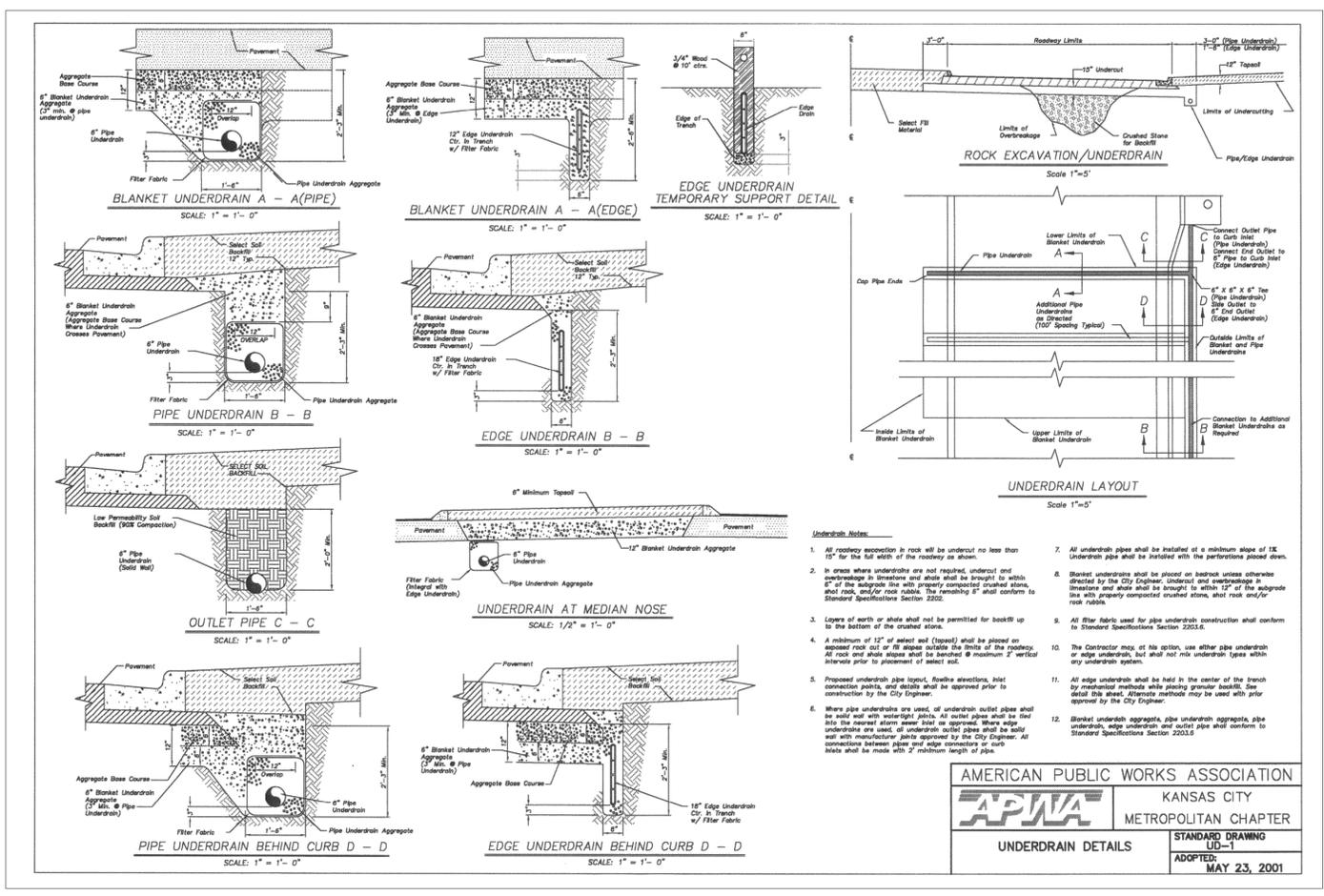
## PIPE BEDDING DETAILS

No Scale



### TYPICAL UNDERDRAIN DETAIL

Not to Scale



### Section 2721

#### Engineered Surface Drainage Products

**GENERAL**  
 PVC surface drainage inlets shall include the drain basin type as indicated on the contract drawing and referenced within the contract specifications. The ductile iron grates for each of these fittings are to be considered an integral part of the surface drainage inlet and shall be furnished by the same manufacturer. The surface drainage inlets shall be as manufactured by Nyloplast a division of Advanced Drainage Systems, Inc., or prior approved equal.

**MATERIALS**  
 The drain basins required for this contract shall be manufactured from PVC pipe stock, utilizing a thermoforming process to reform the pipe stock to the specified configuration. The drainage pipe connection stubs shall be manufactured from PVC pipe stock and formed to provide a watertight connection with the specified pipe system. This joint tightness shall conform to ASTM D3212 for joints for drain and sewer plastic pipe using flexible elastomeric seals. The flexible elastomeric seals shall conform to ASTM F477. The pipe bell spigot shall be joined to the main body of the drain basin or catch basin. The raw material used to manufacture the pipe stock that is used to manufacture the main body and pipe stubs of the surface drainage inlets shall conform to ASTM D1784 cell class 12454.

The grates and frames furnished for all surface drainage inlets shall be ductile iron for structure sizes 8", 10", 12", 15", 18", 24", 30" and 36" and shall be made specifically for each basin so as to provide a round bottom flange that closely matches the diameter of the surface drainage inlet. Grates for drain basins shall be capable of supporting various wheel loads as specified by Nyloplast. 12" and 15" square grates will be hinged to the frame using pins. Ductile iron used in the manufacture of the castings shall conform to ASTM A536 grade 70-50-05. Grates and covers shall be provided painted black.

**INSTALLATION**  
 The specified PVC surface drainage inlet shall be installed using conventional flexible pipe backfill materials and procedures. The backfill material shall be crushed stone or other granular material meeting the requirements of class 1, class 2, or class 3 material as defined in ASTM D2321. Bedding and backfill for surface drainage inlets shall be well placed and compacted uniformly in accordance with ASTM D2321. The drain basin body will be cut at the time of the final grade. No brick, stone or concrete block will be required to set the grate to the final grade height. For load rated installations, a concrete slab shall be poured under and around the grate and frame. The concrete slab must be designed taking into consideration local soil conditions, traffic loading, and other applicable design factors. For other installation considerations such as migration of fumes, ground water, and soft foundations refer to ASTM D2321 guidelines.

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### NYLOPLAST DRAIN BASIN WITH STANDARD GRATE

(1, 2) INTEGRATED DUCTILE IRON FRAME & GRATE TO MATCH BASIN O.D.

(3) VARIABLE INVERT HEIGHTS AVAILABLE (ACCORDING TO PLAN/TAKE OFF)

(4) VARIOUS TYPES OF INLET & OUTLET ADAPTERS AVAILABLE: 4" - 36" FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL, ADS/HANCOR N-12 HP, & PVC SEWER (EX: SDR 35), PVC DWV (EX: SCH 40), PVC C900/C905, CORRUGATED & RIBBED PVC

(5) ADAPTER ANGLES VARIABLE 0° - 360° ACCORDING TO PLANS

(6, 7) TRAFFIC LOADS: CONCRETE SLAB DIMENSIONS ARE FOR GUIDELINE PURPOSES ONLY. ACTUAL CONCRETE SLAB MUST BE DESIGNED TAKING INTO CONSIDERATION LOCAL SOIL CONDITIONS, TRAFFIC LOADING, & OTHER APPLICABLE DESIGN FACTORS. SEE DRAWING NO. 7001-110-111 FOR NON TRAFFIC INSTALLATION.

(8) 8" - 36" STANDARD GRATES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.

9 - 12" - 36" FRAMES SHALL BE DUCTILE IRON PER ASTM A536 GRADE 70-50-05.

10 - 12" - 36" STANDARD GRATES FIT DIRECTLY ONTO DRAIN BASINS WITH THE USE OF A PVC BODY TOP. SEE DRAWING NO. 7001-110-045.

11 - DRAIN BASIN TO BE CUSTOM MANUFACTURED ACCORDING TO PLAN DETAILS. RISERS ARE NEEDED FOR BASINS OVER 8" DUE TO SHIPPING RESTRICTIONS. SEE DRAWING NO. 7001-110-065.

12 - DRAINAGE CONNECTION STUB JOINT TIGHTNESS SHALL CONFORM TO ASTM D2212 FOR CORRUGATED HDPE (ADS N-12/HANCOR DUAL WALL), N-12 HP, & PVC SEWER (EX: SDR 35).

13 - ADAPTERS CAN BE MOUNTED ON ANY ANGLE 0° TO 360°. TO DETERMINE MINIMUM ANGLE BETWEEN ADAPTERS SEE DRAWING NO. 7001-110-012.

14 - 12" - 36" STANDARD GRATES SHALL MEET H-20 LOAD RATING.

15 - 8" & 10" STANDARD GRATES ARE RATED FOR LIGHT DUTY APPLICATIONS ONLY. NO CONCRETE COLUMN NEEDED FOR LIGHT DUTY RATING.

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DRAWN BY: EBC DATE: 1-23-06 REVISED BY: NMH DATE: 06-12-16 DWG SIZE: A SCALE: 1:40 SHEET: 1 OF 1	MATERIAL: PROJECT NO. NAME: TITLE: DRAIN BASIN WITH STANDARD GRATE QUICK SPEC INSTALLATION DETAIL DWG NO.: 7001110-144 REV: J	3130 VERONA AVE BUFORD, GA 30518 PHN (770) 932-2443 FAX (770) 932-2490 www.nyloplast-us.com
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PROJECT:

# Paragon Star Soccer Complex

Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

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**APWA** KANSAS CITY METROPOLITAN CHAPTER

UNDERDRAIN DETAILS

STANDARD DRAWING UB-1

ADOPTED MAY 23, 2001

ISSUE:

10/17/19

PROFESSIONAL SEAL:

DRAWING TITLE:  

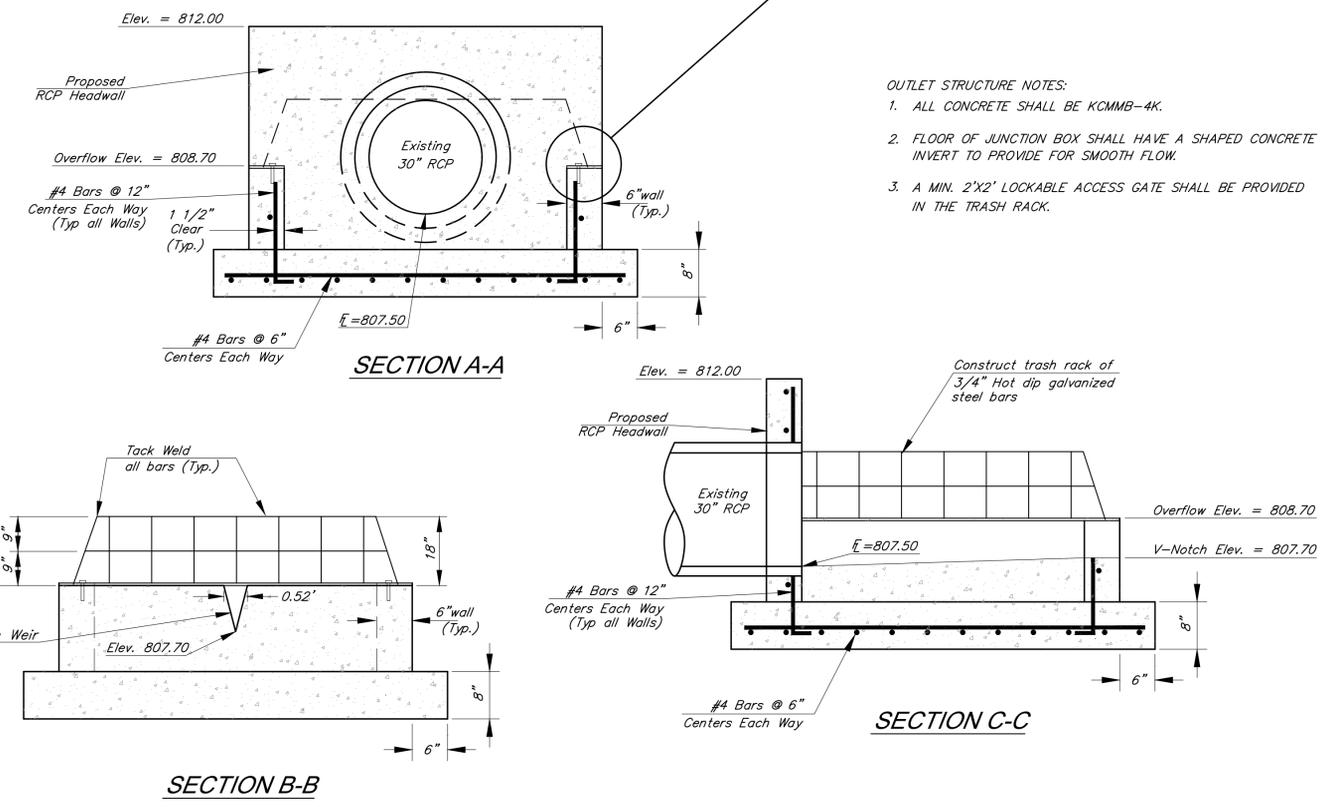
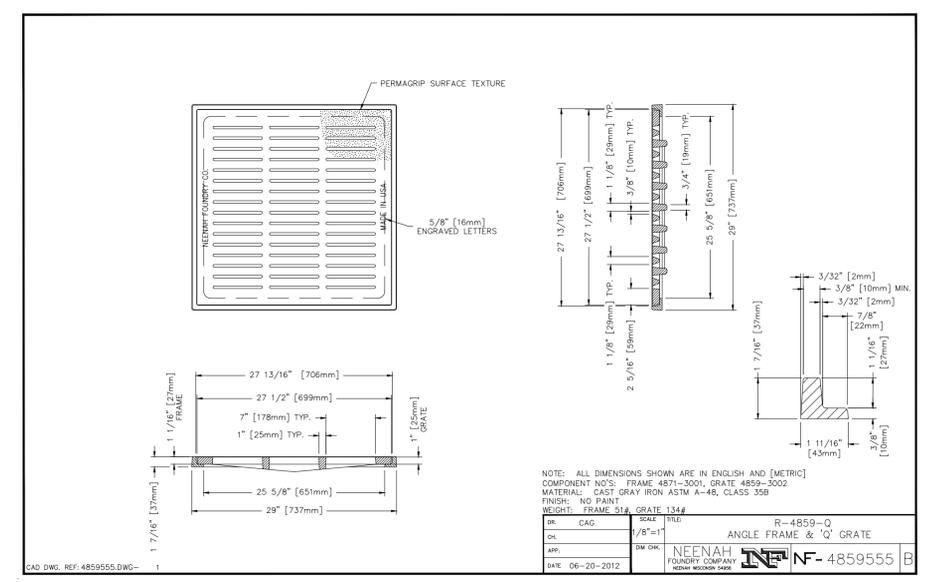
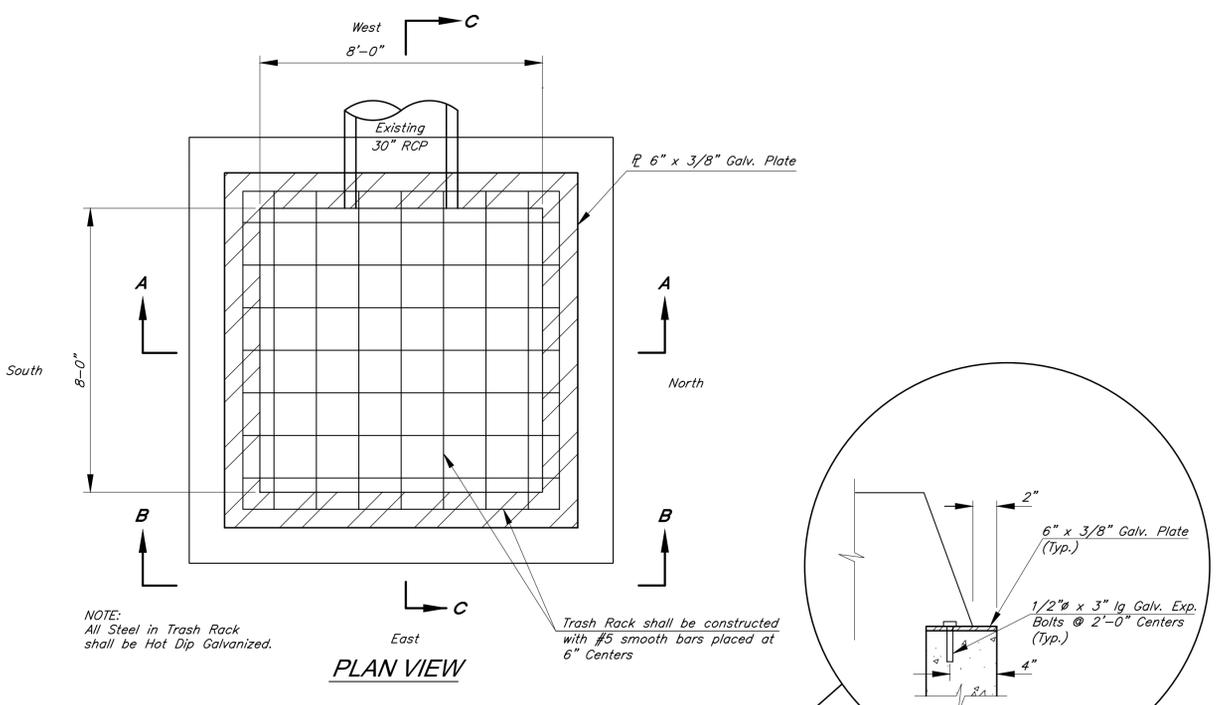
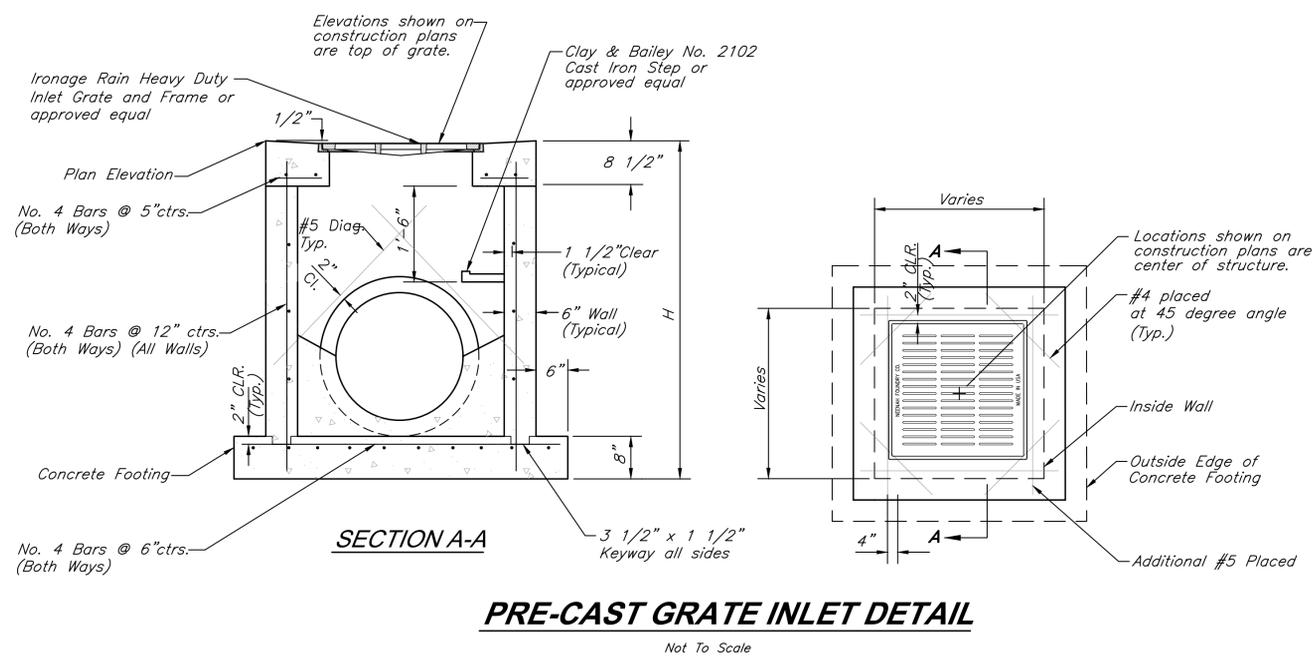
## Storm Sewer Details

JOB NO: 1197 SCALE:  
 DATE: 10.03.2019 DRAWN BY: GBA  
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20

GBA PN 12720.09

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PROJECT:  
**Paragon Star Soccer Complex**  
 Soccer Complex Storm Sewer  
 1401 NW View High Dr, Lee's Summit, MO 64081  
 Field Storm Sewer Plans

ISSUE:  
 10/17/19

PROFESSIONAL SEAL:

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**Storm Sewer Details**

JOB NO: 1197 SCALE:  
 DATE: 10.03.2019 DRAWN BY: GBA

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**21**

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**2499CGD**  
 APPROX. DRAIN AREA = 270.64 SQ IN  
 APPROX. WEIGHT = 53.00 LBS

SECTION A-A

DIMENSIONS ARE FOR REFERENCE ONLY  
 ACTUAL DIMENSIONS MAY VARY  
 DIMENSIONS ARE IN INCHES  
 QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05  
 PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT  
 LOCKING DEVICE AVAILABLE UPON REQUEST

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**1599CGP**  
 APPROX. DRAIN AREA = 81.25 SQ IN  
 APPROX. WEIGHT WITH FRAME = 53.70 LBS

HINGED GRATE FOR EASY ACCESS

DIMENSIONS ARE FOR REFERENCE ONLY  
 ACTUAL DIMENSIONS MAY VARY  
 DIMENSIONS ARE IN INCHES  
 GRATE MEETS H-10 LOAD RATING  
 QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05  
 PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT  
 SIZE OF OPENING MEETS REQUIREMENTS OF AMERICAN DISABILITY ACT AS STATED IN FEDERAL REGISTER PART III, DEPARTMENT OF JUSTICE, 28 CFR PART 36.  
 LOCKING DEVICE AVAILABLE UPON REQUEST SEE DRAWING NO. 7001-110-031

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**3099CGD**  
 APPROX. DRAIN AREA = 409.94 SQ IN  
 APPROX. WEIGHT WITH FRAME = 93.00 LBS

SECTION A-A

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 DIMENSIONS ARE IN INCHES  
 QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05  
 PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT  
 LOCKING DEVICE AVAILABLE UPON REQUEST

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PROJECT:

Paragon Star Soccer Complex

Soccer Complex Storm Sewer  
 1401 NW View High Dr., Lee's Summit, MO 64081  
 Field Storm Sewer Plans

ISSUE:

10/17/19



DRAWING TITLE:

Storm Sewer Details

JOB NO: 1197 SCALE:

DATE: 10.03.2019 DRAWN BY: GBA

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### 1899CGC

APPROX. WEIGHT WITH FRAME = 68.50 LBS

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DIMENSIONS ARE IN INCHES  
GRATE MEETS H-20 LOAD RATING  
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05  
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT  
LOCKING DEVICE AVAILABLE UPON REQUEST SEE DRAWING NO. 7001-110-027

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<b>DRAWN BY</b>	EBC	<b>MATERIAL</b>	DUCTILE IRON
<b>DATE</b>	3-8-06	<b>PROJECT NO./NAME</b>	
<b>REVISED BY</b>	EBC	<b>TITLE</b>	18 IN SOLID COVER ASSEMBLY - TYPE C
<b>DATE</b>	3-13-10	<b>DWG NO.</b>	7001-110-214
<b>DWG SIZE</b>	A	<b>SCALE</b>	1:10
<b>SHEET</b>	1 OF 1	<b>REV</b>	C

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### 2499CGC

APPROX. WEIGHT WITH FRAME = 138.00 LBS

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DIMENSIONS ARE IN INCHES  
GRATE MEETS H-20 LOAD RATING  
QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05  
PAINT: CASTINGS ARE FURNISHED WITH A BLACK PAINT  
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<b>DATE</b>	3-8-06	<b>PROJECT NO./NAME</b>	
<b>REVISED BY</b>	EBC	<b>TITLE</b>	24 IN SOLID COVER ASSEMBLY - TYPE B
<b>DATE</b>	3-13-10	<b>DWG NO.</b>	7001-110-218
<b>DWG SIZE</b>	A	<b>SCALE</b>	1:10
<b>SHEET</b>	1 OF 1	<b>REV</b>	C

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### 2499CGP

APPROX. DRAIN AREA = 164.10 SQ IN  
APPROX. WEIGHT WITH FRAME = 99.50 LBS

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DIMENSIONS ARE IN INCHES  
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QUALITY: MATERIALS SHALL CONFORM TO ASTM A536 GRADE 70-50-05  
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SIZE OF OPENINGS MEETS REQUIREMENTS OF AMERICAN DISABILITY ACT AS STATED IN FEDERAL REGISTER PART III, DEPARTMENT OF JUSTICE, 28 CFR PART 36.  
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<b>DATE</b>	3-8-06	<b>PROJECT NO./NAME</b>	
<b>REVISED BY</b>	EBC	<b>TITLE</b>	24 IN PEDESTRIAN GRATE ASSEMBLY - TYPE B
<b>DATE</b>	3-13-10	<b>DWG NO.</b>	7001-110-216
<b>DWG SIZE</b>	A	<b>SCALE</b>	1:10
<b>SHEET</b>	1 OF 1	<b>REV</b>	C

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### 3099CGD

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APPROX. WEIGHT WITH FRAME = 93.00 LBS

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<b>DATE</b>	3-8-06	<b>PROJECT NO./NAME</b>	
<b>REVISED BY</b>	EBC	<b>TITLE</b>	38 IN DOME GRATE
<b>DATE</b>	3-10-11	<b>DWG NO.</b>	7001-110-223
<b>DWG SIZE</b>	A	<b>SCALE</b>	1:8
<b>SHEET</b>	1 OF 1	<b>REV</b>	D

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PROJECT:

## Paragon Star Soccer Complex

Soccer Complex Storm Sewer  
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Field Storm Sewer Plans

ISSUE:

10/17/19

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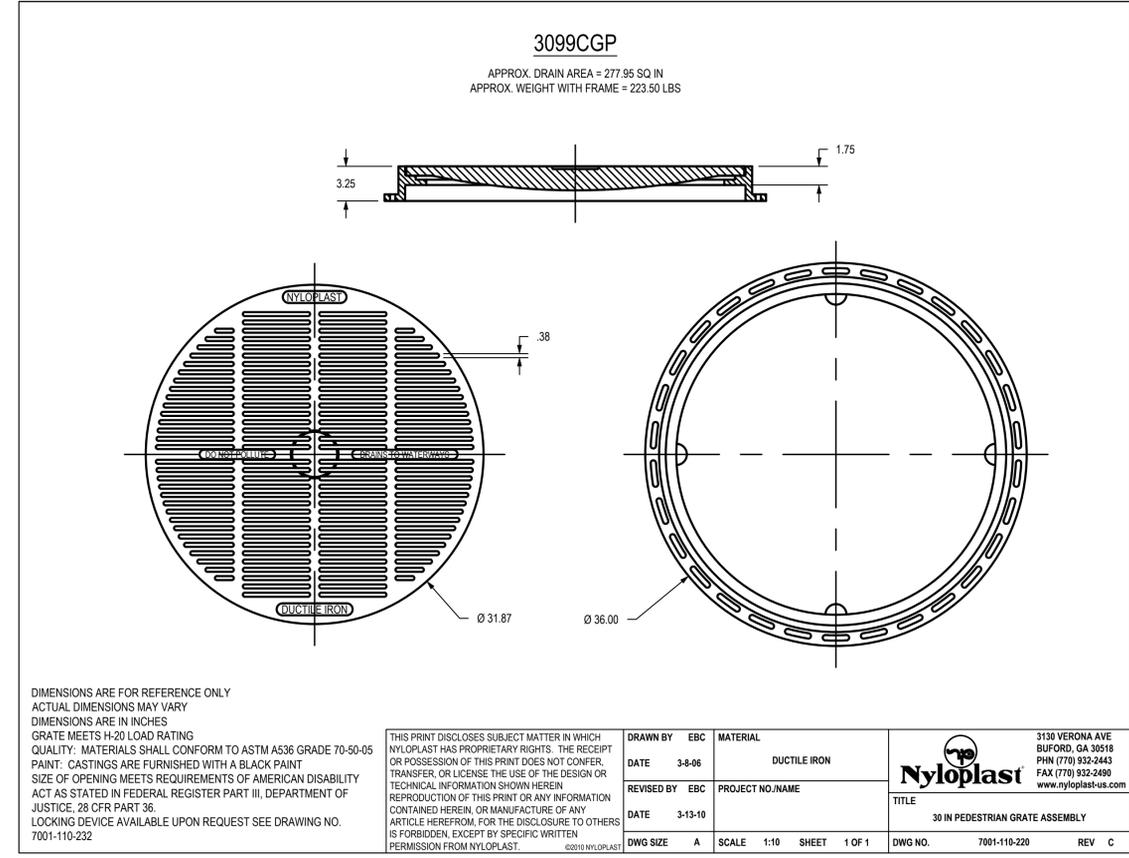
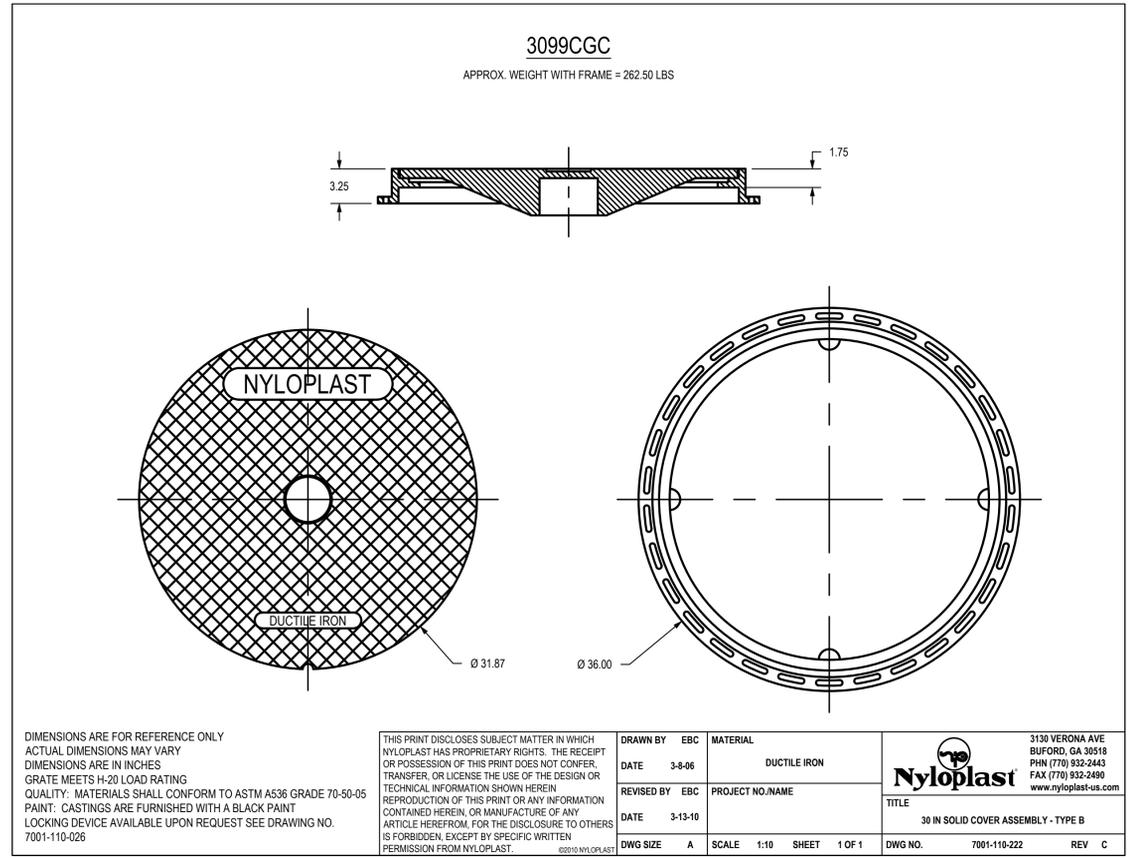
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JOB NO: 1197 SCALE:

DATE: 10.03.2019 DRAWN BY: GBA

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PROJECT:

**Paragon Star Soccer Complex**  
Soccer Complex Storm Sewer  
1401 NW View High Dr, Lee's Summit, MO 64081  
Field Storm Sewer Plans

ISSUE:

10/17/19



DRAWING TITLE:

**Storm Sewer  
Details**

JOB NO: 1197      SCALE:

DATE: 10.03.2019      DRAWN BY: GBA

SHEET NO: