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ENVIRONMENTAL ENGINEERS • DESIGNERS • SCIENTISTS

TECHNICAL MEMORANDUM

CITY OF AMARILLO
MARTIN ROAD LAKE
Storm Water Master Plan Project
Data Collection Criteria Manual

STATE OF TEXAS
ADAM J. ROSE
97317
LICENSED
PROFESSIONAL ENGINEER

11/26/13

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Prepared For:	Mark Read, P.E., City Engineer
Prepared By:	Adam Rose, P.E. Lauren Plunk, P.E.
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INTRODUCTION:

The purpose of this memorandum is to document the methodology and results of a risk-based assessment of drainage structures located throughout the City of Amarillo (City) Martin Road Lake Drainage Area. The results of the condition assessment are intended to support project recommendations (Task 4). This risk-based approach to asset management provides not only the condition information required to make project recommendations but also a ranking of each location, which can be used to develop, group and phase solutions to drainage problems. Due to the size (approximately 800 pages) the photographs of each site are included on the project website.

CONDITION ASSESSMENT METHODOLOGY:

A condition assessment was performed on specific drainage structures (outfalls, inlets, channels, the pump station, the storm sewer system, and the playa lake) selected by the project team as part of the kickoff meeting. Condition (likelihood and type of failure) information collected at each site is used to catalog the varying types of erosion and conveyance control measures and determine the primary cause of existing or potential failures such as playa lake wave erosion, channel erosion outfall failure, or structural failure. For the inlets, channels, and outfalls, the risk of each site was estimated by collecting condition and criticality data for each of the specific drainage locations. For the pump station and playa lake, a visual inspection was used to identify signs of hydraulic degradation or condition failures. For the storm sewer system, CCTV technology was used to evaluate the internal condition of the pipe. The

general drainage sites are displayed in Figure 1. Condition scores, criticality scores, and risk scores for inlets, channels, and outfalls are provided in Appendix A.

Outfalls, Inlets and Channels

Criticality (consequence of failure) information was also collected at each site. These data were used to rank the individual sites based on total risk and to explore any connections between existing condition and current criticality. The general drainage sites are displayed in Figure 1.

Due to the numerous structures to be evaluated, a mobile phone application was developed which enabled data to be collected while in the field. These data included photos of each site with location specific identification, GIS coordinates, and date and time stamp of each investigation. In addition to the photographic documentation, the condition and criticality score could be uploaded remotely and site specific notes could be added for reference purposes, such as utility conflicts. More information about this methodology can be found in Appendix B.

The condition of each structure was evaluated based on its current physical condition, erosion protection performance within 100-feet of the structure, and maintainability based on the scoring system is outlined in Tables 1 and 2. Each category was assigned a weighted percentage as outlined in Tables 3 and 4. The criteria, scores and weights were developed as part of the project workshop facilitated in Task A. The sum of an individual condition criteria score and criterion weight determines the weighted score of the criterion. The sum of all criteria provides an overall condition score.

Table 1: Condition Description Guidelines – Outfalls and Channels

Element	**Description**				
SCORE	**1**	**2**	**3**	**4**	**5**
Physical Condition of Structure	Substantially exceeds current requirements	Exceeds current requirements	Obvious concerns: cost/benefit questions	Inefficient; becoming ineffective, obsolete	Failing, not capable of sustaining required performance
Erosion Protection Performance within 100' of Structure	Negligible attention required: exceeds requirements	Minor erosion concerns	Obvious concerns: cost/benefit questions	Difficult to sustain performance	Failing, not capable of sustaining required performance
Maintainability (Replacement Magnitude)	None	Minimal	Moderate: specifications probably required but effort not significant	Can be maintained with significant effort	Not currently maintainable
% Physical life consumed	Almost new; up to 10% physical life consumed	Up to 30% physical life consumed	Up to 70% physical life consumed	Up to 90% physical life consumed	Virtually consumed, imminent failure

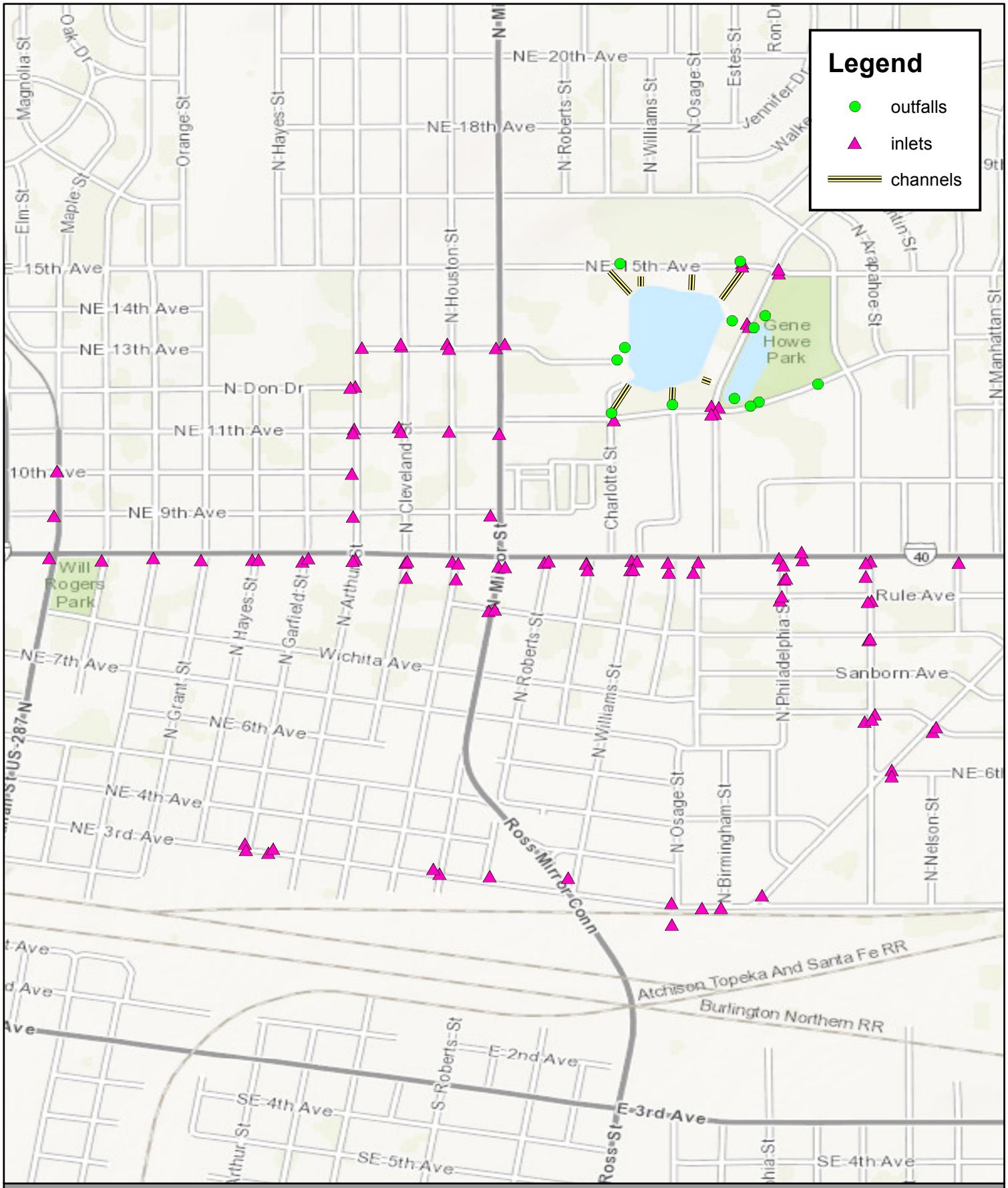

Figure 1: General Drainage Sites

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N

0 1,000 2,000 3,000 Feet

City of Amarillo
Martin Road Lake

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Table 2: Condition Description Guidelines – Inlets

Element	Description				
SCORE	1	2	3	4	5
Physical Condition of Structure	Substantially exceeds current requirements	Exceeds current requirements	Obvious concerns: cost/benefit questions	Inefficient; becoming ineffective, obsolete	Failing, not capable of sustaining required performance
Prior Complaints	None	None	1 complaint	1 complaint	2+ complaints within 5 years
Capacity	<24" main line	<36" main line	<48" main line	<60" main line	>60" main line
Maintainability (Replacement Magnitude)	None	Minimal	Moderate: specifications probably required but effort not significant	Can be maintained with significant effort	Not currently maintainable
% Physical life consumed	Almost new; up to 10% physical life consumed	Up to 30% physical life consumed	Up to 70% physical life consumed	Up to 90% physical life consumed	Virtually consumed, imminent failure

Table 3: Condition Weightings – Outfalls and Channels

Category	Weight
Physical Condition	45%
Erosion Protection Performance	35%
Maintainability (Replacement Frequency)	20%
Total (must = 100%)	**100%**

Table 4: Condition Weightings - Inlets

Category	Weight
Physical Condition	30%
Prior Complaints	30%
Capacity	20%
Maintainability (Replacement Frequency)	20%
Total (must = 100%)	**100%**

The criticality of each structure was evaluated based on the structure's potential failure and its impact to the community, safety and liability to the public, environmental and regulatory concerns, and replacement difficulty based on the scoring system outlined in Table 5. Each category was assigned a weighted percentage as outlined in Table 6. The criteria, scores and weights were developed as part of the project workshop facilitated in Task A. The sum of an individual criticality criteria score and criterion weight determines the weighted score of the criterion. The sum of all criteria provides an overall criticality score.

Table 5: Criticality Description Guidelines – Outfalls, Channels, Inlets

Element	**Description**				
SCORE	**1**	**2**	**3**	**4**	**5**
Community Impact	No Impacts	Small Impact (only immediate landowner impacted; minimal customers impacted)	Moderate Impact (short duration, affect directly adjoining landowners, customers may avoid site)	Serious Impact (long duration, affect multiple landowners and structures, customers avoid site)	Severe Impact (affect multiple landowners and/or customers daily lives for a large distance from site)
Safety/Liability Impact	No impacts	Unlikely but potential safety hazard	Minor potential damage to property or unlikely injury	Major potential damage to property or likely injury	Potential loss of life
Environmental/ Regulatory Impact: Scale of Soil/Habitat Lost or Disturbed in Current Condition)	No impacts	Minimal disturbance: erosion only directly at structure/soil interface	Disturbance within 100' of structure	Disturbance beyond 100' of structure	Immediate remediation required to prevent loss of significant habitat or regulatory violation.
Replacement Difficulty to Original Design Condition (Not Including Land Rights)	Replacement with existing manpower/ equipment/ maintenance schedules	Replacement required through additional contracts or specialized equipment/contractors	Replacement requires outside contractor and/or minimal engineering	Full engineering services required: can be restored to original design	Full engineering services required, Impractical to replace with existing design; requires extensive modifications to existing conditions
Failure Consequence	Almost none	Short term affects to small area	Long term affects to small area	Long term affects to large area	Virtual disaster

Table 6: Criticality Weightings

Category	Weight
Community Impact	25%

Safety/Liability Impact	40%
Environmental/Regulatory Impact	15%
Replacement Difficulty	20%
Total (must = 100%)	**100%**

Pumps Stations

A visual inspection and interview of Amarillo staff was conducted to determine the general condition of the pump station. A detailed evaluation of the electrical or mechanical system was not included in this contract phase.

Storm Sewer System

The storm sewer condition assessment was conducted utilizing CCTV technology. CCTV technology uses a camera with a light that is self-propelled or pulled down a sewer line. As the camera moves through the pipe, it records the condition and transmits information to personnel above ground. CCTV may be used on empty or partially filled pipes to determine conditions above the water surface. CCTV captures conditions of the pipe, including cracks, fractures, broken pipe, holes, deformities , joint displacement, open joints, surface damage, roots, infiltration, encrustation, debris, and obstructions.

Martin Road Lake

A visual inspection of the lake and immediate surrounding areas was performed. This assessment was meant to cover any physical features of the lake that were not covered as part of the other assessment techniques. This also provided a review of the lake layout for the purposes of future grading for flood mitigation.

CONDITION ASSESSMENT RESULTS:

For outfalls, inlets, and channels, the condition and criticality scoring was used to rank assets and provide recommendations for improvements. For the pump station, storm sewer system, and Martin Road Lake, the results from the visual and CCTV inspection were used to develop general recommendations for improvements.

Outfalls, Inlets and Channels

The overall condition score was multiplied by the overall criticality score to obtain a risk score, which identified the locations with the highest potential need for repair. As with any assessment, this scoring system is subjective and is comparative in nature: as more structures are reviewed the range of physical results (and thus the range of responses) will change, potentially changing the scoring of the earlier sites.

The result of this condition assessment is provided as Appendix A. The assessment is also provided electronically, in Microsoft Excel spreadsheet form, on the project website. This spreadsheet allows the user to sort and filter according to specific parameters such as risk score, erosion failure, structure, location, etc. The spreadsheet also includes webpage links to Google Maps showing the structure locations on an aerial photo and a webpage link to the photos taken at each location. Offline PDF copies of each site are provided electronically on the APAI FTP site.

Pumps Stations

The pump station at Martin Road Lake consists of one pump and a SCADA system to maintain water levels in the lake. The Amarillo maintenance staff operates the pump station such that the water surface elevation of Martin Road Lake is at approximately 3610.00 (under normal conditions). The current conditions of the pump station are fair; the pump station is in working order and Amarillo staff does not anticipate any impending mechanical failures. There is minor erosion at the base of the fence on the north side of the pump station that should be addressed.

Storm Sewer System

The CCTV inspection determined that the Martin Road Lake storm sewer system is generally in good condition. There were some sections of line that were inaccessible due either to trash in the line or inlet configuration that did not allow access. The predominant CCTV comment was that trash accumulated in certain sections of the lines that were evaluated. No major structural concerns were found in the report. A copy of the full inspection report was provided to the City. A hydraulic evaluation will be conducted in Phase 2 of this project to determine capacity related improvements. A small budget for spot repairs is included in the conclusions section of this memorandum.

Martin Road Lake

The lake (and immediate surrounding area) was reviewed for stability and condition and found to be operating well. There are isolated areas of rill and overland erosion near the water surface of the western lake. These areas do not appear to require immediate attention but should be monitored to ensure that they are stable. Other physical facilities of the lake area are covered under separate assessments.

CONDITION ASSESSMENT CONCLUSIONS:

The results of the condition assessment (previous section) will be used in the Phase 1 project memorandum to provide project recommendations. This conclusions section provides a brief discussion of the results of data analyses performed on the actual condition and criticality data.

The risk-based assessment of the drainage structures was first reviewed to determine the overall percentage of structures falling into different categories of risk. Based on the condition and criticality

scores and weights, the lowest and highest risk an asset could score is 1.0 and 25.0, respectively. The range of scores was divided into quartiles and the structures were ranked from lowest to highest risk. The results are provided in Table 7 and detailed in Appendix A. In addition to documentation of the condition and criticality scoring, Appendix A also includes recommendations, preliminary cost information, and recommendations for routine maintenance.

The projects were divided into three phases based on the asset scores: Phase 1 projects, which consist of the top 10% of the asset scores, are considered short term priority (1 year time period) and indicate immediate improvements are required. Phase 2 projects, which consist of the top 50% of the asset scores, are considered medium term priority (1-5 year time period). Phase 3 projects, which consist of the remaining assets where improvements may be needed in the future, should be considered in the 5+ year time period.

Table 7: Asset Costs Ranked by Risk Categories

Category	Phase			Total	Notes
	1	2	3		
Inlet	$21,000	$40,000	-	**$61,000**	See detailed listing of inlets for condition and notes in Appendix A.
Outfall	$24,000	$41,000	$26,000	**$91,000**	
Channel	$180,000	$77,000	$116,000	**$373,000**	
Pump Station	$8,000	-	$1,000	**$9,000**	Visual inspection showed no obvious signs of hydraulic degradation or condition failures. Costs are for more detailed evaluation of pump performance and detailed condition/inspection.
Playa Condition	-	-	$6,000	**$6,000**	No uncategorized issues detected: costs are for future, ongoing inspections.
Playa Flood Control	$4,215,000	$4,117,000	-	**$8,332,000**	Assuming Alternative 2b.
Storm Sewer Condition	$10,000	$5,000	-	**$15,000**	No major issues detected with CCTV - costs are placeholders for small/spot repairs.
Storm Sewer Capacity	-	-	-	**-**	Hydraulic evaluation not completed (Phase 2) - placeholder.
Total	**$4,458,000**	**4,280,000**	**$149,000**	**$8,887,000**	

Phase 1 Short Term Priority - 1 year time period. Top 10% of assets or immediate improvements required
Phase 2 Medium Term Priority - 1-5 year time period. Top 50% of assets or improvements required.
Phase 3 Long Term Priority - 5+ year time period. Improvements may be needed.

APPENDIX A

CITY OF AMARILLO
MARTIN ROAD LAKE
Storm Water Master Plan Project
Data Collection Criteria Manual

Ranked Outfall Assets
Martin Road Lake

						Condition				Criticality										
Site Name	Structure Type	Erosion Protection?	Pipe Size	Existing and/or Potential Failure Type	Routine Maintenance Items?	Physical Condition 45%	Erosion Protection 35%	Maintainability 20%	Score	Community 25%	Safety and Liability 40%	Environmental and Regulatory 15%	Replacement 20%	Score	Recommendations	Risk Score	Risk Rank	Risk Percentile	Capital Cost (2013 Dollars)*	Site Photos
Outfall 6	outfall	concrete	single - 4'	Outfall pipe exposed, fractured concrete, severe erosion level, slight vegetation.	minimal trash and graffiti	5	5	4	4.8	4	4	4	4	4	Replacement/extensive rehabilitation required.	19.2	1	10%	$ 10,000	http://aapp.apaienv.com/photos/amarillo/outfall-6/pdf
Outfall 10	outfall	concrete	quad - 4',4,,3.75', 5'	Minor erosion, but strucuture in poor condition.	N/A	5	2	5	3.95	2	4	2	4	3.2	Redesign and new construction of outfall may be appropriate.	12.6	2	10%	$ 10,000	http://aapp.apaienv.com/photos/amarillo/outfall-10/pdf
Outfall 11	outfall	none	double - 2.5'	Severe erosion, exposed irrigation? Line, dirt in outfall piping. Structure is in good condition.	N/A	2	5	2	3.05	4	4	4	2	3.6	Erosion preventation should be installed. Erosion damage should be repaired.	11.0	3	10%	$ 2,000	http://aapp.apaienv.com/photos/amarillo/outfall-11/pdf
Outfall 5	outfall	none	single - 4'	Existing erosion protection not provided.	minimal trash and graffiti	3	2	3	2.65	3	3	2	3	2.85	Provide erosion protection.	7.6	4	50%	$ 3,500	http://aapp.apaienv.com/photos/amarillo/outfall-5/pdf
Outfall 4	outfall	concrete	double - 4'	Severe vegetation growth at top of structure (trees) and fracturing at stress points of structure (tree roots potential cause).	moderate trash and graffiti	3.5	1.5	4	2.9	2	3	2	3	2.6	Remove vegetative growth and repair/rehabilitate struture.	7.5	5	50%	$ 14,000	http://aapp.apaienv.com/photos/amarillo/outfall-4/pdf
Outfall 2	outfall	concrete	single - 1.5'	Erosion (void underneath apron) and tree fracturing concrete apron.	minimal trash and graffiti	3	2	3	2.65	1	2	2	3	1.95	Moderate erosion repair at the structure/soil interface, remove tree and repair concrete apron.	5.2	6	50%	$ 15,000	http://aapp.apaienv.com/photos/amarillo/outfall-2/pdf
Outfall 12	outfall	concrete	single - 2.5'	Erosion has created a pool of standing water.	minor trash	2	3	1	2.15	3	2	2	1	2.05	Erosion preventation should be installed. Erosion damage (pool) should be repaired.	4.4	7	100%	$ 2,000	http://aapp.apaienv.com/photos/amarillo/outfall-12/pdf
Outfall 7	outfall	concrete	single - 6'	Minor erosion overall, severe at top of structure.	moderate trash	1	4	1	2.05	1	2	2	1	1.55	Erosion preventation should be installed at top of structure and erosion damage should be repaired.	3.2	8	100%	$ 5,000	http://aapp.apaienv.com/photos/amarillo/outfall-7/pdf
Outfall 1	outfall	concrete	double - 5'	Erosion at top of structure and broken concrete.	minimal trash	2	2	2	2	1	1	2	1	1.15	Moderate erosion repair at the structure/soil interface (particularly at top of structure) and the concrete at the base of the structure is fractured.	2.3	9	100%	$ 6,250	http://aapp.apaienv.com/photos/amarillo/Outfall-1/pdf
Outfall 8	outfall	concrete	double - 5'	Minor erosion.	minor trash	1	2	1	1.35	1	1	2	1	1.15	Minor erosion to be corrected by city staff.	1.6	10	100%	$ 3,000	http://aapp.apaienv.com/photos/amarillo/outfall-8/pdf
Outfall 9	outfall	concrete	single - 2.5'	Structure in good conditon, and no erosion present. However, debris is blocking outfall.	moderate trash and debris	1	1	2	1.2	2	1	1	1	1.25	It is recommended that city staff clear debris at outfall.	1.5	11	100%	$ 2,000	http://aapp.apaienv.com/photos/amarillo/outfall-9/pdf
Outfall 3	outfall	concrete	single - 5.75'	Erosion at bottom of structure (likely submerged most of year).	minimal trash and moderate graffiti	1	1.5	1	1.175	1	1	2	1	1.15	Minimal erosion repair at base of structure.	1.4	12	100%	$ 2,000	http://aapp.apaienv.com/photos/amarillo/outfall-3/pdf
Outfall 13	outfall	concrete	single - 1'	N/A	N/A	1	1	1	1	1	1	1	1	1	No recommendations.	1.0	13	100%	$ 1,000	http://aapp.apaienv.com/photos/amarillo/outfall-13/pdf

* The prices shown as based on site visit and reconnaissance and on conceptual possible solutions to mitigate deteriorated structures or channels. The investigation did not include sub-surface soil condition assessments or soil slope stability analysis which may impact the cost of the project.

Ranked Channel Assets
Martin Road Lake

						Condition				Criticality						Risk				
Site Name	Structure Type	Erosion Protection?	Pipe Size	Existing and/or Potential Failure Type	Routine Maintenance Items?	Physical Condition 45%	Erosion Protection 35%	Maintainability 20%	Score	Community 25%	Safety and Liability 40%	Environmental and Regulatory 15%	Replacement 20%	Score	Recommendations	Score	Rank	Percentile	Capital Cost (2013 Dollars)*	Site Photos
Channel 3	channel	concrete rubble	N/A	Heavy erosion present.	high level of trash	5	5	4	4.8	4	4	3	4	3.85	Redesign and new construction of channel may be appropriate.	18.5	1	10%	$ 15,000	http://aapp.apaienv.com/photos/amarillo/Channel-3/pdf
Channel 2	channel		N/A	slight erosion	many dead trees, moderate trash	3	2	3	2.65	3	2	1	1	1.9	Address with internal maintenance. Potential use of contractor to clear out dead vegetation and debris.	5.0	2	50%	$ 60,000	http://aapp.apaienv.com/photos/amarillo/Channel-2/pdf
Channel 1	channel	concrete rubble	N/A	slight erosion	high level of trash	2.5	2	2	2.225	2	1	1	1	1.25	Address with internal maintenance. Potential use of contractor to clear out dead vegetation and debris.	2.8	3	50%	$ 4,000	http://aapp.apaienv.com/photos/amarillo/Channel-1/pdf
Channel 4	channel	concrete rubble	N/A	slight erosion	moderate trash	2	2	2	2	2	1	1	1	1.25	Address with internal maintenance. Potential use of contractor to clear out dead vegetation and debris.	2.5	4	100%	$ 90,000	http://aapp.apaienv.com/photos/amarillo/Channel-4/pdf
Channel 7	channel	concrete	N/A	slight erosion	minimal trash	1	2	1	1.35	1	1	1	1	1	Address with internal maintenance.	1.4	6	100%	$ 4,500	http://aapp.apaienv.com/photos/amarillo/Channel-7/pdf
Channel 6	channel	concrete	N/A	Tree at downstream end that has broken the concrete lining. Area surrounding pedetrian step is eroded, increasing distance between step and ground.	minimal trash	1	2	2	1.55	1	2	1	1	1.4	Remove tree and repair concrete lining. Fix erosion damage near pedestrian step.	2.2	5	100%	$ 2,000	http://aapp.apaienv.com/photos/amarillo/Channel-6/pdf
Channel 5	channel	concrete	N/A	No erosion present.	minimal trash	1	1	1	1	1	1	1	1	1	Address with internal maintenance.	1.0	7	100%	$ 2,000	http://aapp.apaienv.com/photos/amarillo/Channel-5/pdf

* The prices shown as based on site visit and reconnaissance and on conceptual possible solutions to mitigate deteriorated structures or channels. The investigation did not include sub-surface soil conditions, pipe conditions and TV inspection of these inlets.

Ranked Inlet Assets
Martin Road Lake

							Condition					Criticality						Risk				
Site Name	Structure Type	Throat height (feet)	Lid Size (inches)	Box depth (feet)	Existing and/or Potential Failure Type	Routine Maintenance Items?	Physical Condition 30%	Prior Complaints 30%	Capacity 20%	Maintainability (Replacement Frequency) 20%	Score	Community 25%	Safety and Liability 40%	Environmental and Regulatory 15%	Replacement 20%	Score	Recommendations	Score	Rank	Percentile	Capital Cost (2013 Dollars)*	Site Photos
2021	inlet	7	18	2	Volume of trash prevents the inlet from functioning properly. Discharge pipe and box assumed to be in poor condition (since inspection not possible).	large volume of trash	4.2	1	3	5	3.16	3	3	5	3.5	3.4	Immediately clean out trash and re-inspect condition.	10.7	1	10%	$800	http://aapp.apaienv.com/photos/amarillo/2021/pdf
2588	inlet	8	18	2	Volume of trash prevents the inlet from functioning properly. Discharge pipe and box assumed to be in poor condition (since inspection not possible).	large volume of trash	4.2	1	3	5	3.16	3	3	5	3.5	3.4	Immediately clean out trash and re-inspect condition.	10.7	1	10%	$800	http://aapp.apaienv.com/photos/amarillo/2588/pdf
1988	inlet	8	18	4.67	Box and top in poor condition.	trash	3.8	1	2	4	2.64	3	3	2	3.5	2.95	Correct top and box condition.	7.8	3	10%	$6,500	http://aapp.apaienv.com/photos/amarillo/1988/pdf
1968	inlet	7	18	6	Top condition is poor.	trash	3.4	1	3	3	2.52	3	3	2	3.5	2.95	Correct top condition.	7.4	4	10%	$1,000	http://aapp.apaienv.com/photos/amarillo/1968/pdf
2156	inlet	9	20	4.5	Box and top in poor condition.	trash	3.8	1	1	4	2.44	3	3	2	3.5	2.95	Correct top and box condition.	7.2	5	10%	$1,000	http://aapp.apaienv.com/photos/amarillo/2156/pdf
2162	inlet	6	18	4.4	Throat and top condition is poor.	trash	3.8	1	1	4	2.44	3	3	2	3.5	2.95	Correct top and throat condition.	7.2	5	10%	$1,200	http://aapp.apaienv.com/photos/amarillo/2162/pdf
1973	inlet	8	18	3.25	Inlet smells like sewage, throat condition is poor.	odor trash	4	1	1	2	2.1	3	3	5	3.5	3.4	Investigate sewage smell immediately - rull out cross connection. Correct top condition.	7.1	7	10%	$2,000	http://aapp.apaienv.com/photos/amarillo/1973/pdf
2798	inlet	8			Manhole is buried.	Manhole is buried.	5	1	3	5	3.4	3	1	4	1	1.95	Exacavate manhole and re-inspect condition.	6.6	8	10%	$4,500	http://aapp.apaienv.com/photos/amarillo/2798/pdf
1947	inlet	6	18	4.5	Top condition is poor.	trash	3.4	1	2	3	2.32	3	3	1	3.5	2.8	Correct top condition.	6.5	9	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/1947/pdf
1976	inlet	8	18	5.5	Top condition is poor.	trash	3.4	1	2	3	2.32	3	3	1	3.5	2.8	Correct top condition.	6.5	9	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/1976/pdf
2002	inlet	6	18	7.8	Top condition is poor.	trash	3.4	1	2	3	2.32	3	3	1	3.5	2.8	Correct top condition.	6.5	9	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2002/pdf
2152	inlet	7	18	4.8	Top condition is poor.	trash	3.4	1	2	3	2.32	3	3	1	3.5	2.8	Correct top condition.	6.5	9	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2152/pdf
2595	inlet	8	18	4.5	Top condition is poor.	trash	3.4	1	2	3	2.32	3	3	1	3.5	2.8	Correct top condition.	6.5	9	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2595/pdf
2132	inlet	8.5	20	9.25	Top condition is poor.	trash	2.2	1	4	2	2.16	3	3	1	3.5	2.8	Correct top condition.	6.0	14	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2132/pdf
2133	inlet	9	20	9.33	Top condition is poor.	trash	2.2	1	4	2	2.16	3	3	1	3.5	2.8	Correct top condition.	6.0	14	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2133/pdf
1950	inlet	7	24	3	Top condition is poor (exposed rebar).	trash	3.4	1	1	3	2.12	3	3	1	3.5	2.8	Correct top condition.	5.9	16	50%	$2,000	http://aapp.apaienv.com/photos/amarillo/1950/pdf
1967	inlet	6	18	5.25	Top condition is poor.	trash	3.4	1	1	3	2.12	3	3	1	3.5	2.8	Correct top condition.	5.9	16	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/1967/pdf
1990	inlet	7	18	3.75	Top condition is poor.	trash	3.4	1	1	3	2.12	3	3	1	3.5	2.8	Correct top condition.	5.9	16	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/1990/pdf
1994	inlet	8	18	3.5	Top condition is poor.	trash	3.4	1	1	3	2.12	3	3	1	3.5	2.8	Correct top condition.	5.9	16	50%	1000	http://aapp.apaienv.com/photos/amarillo/1994/pdf
1998	inlet	7	18	5	Top condition is poor.	trash	3.4	1	1	3	2.12	3	3	1	3.5	2.8	Correct top condition.	5.9	16	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/1998/pdf
2136	inlet	8	20	3.33	Top condition is poor.	trash	3.4	1	1	3	2.12	3	3	1	3.5	2.8	Correct top condition.	5.9	16	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2136/pdf
2154	inlet	20	20	3.25	Top condition is poor.	trash	3.4	1	1	3	2.12	3	3	1	3.5	2.8	Correct top condition.	5.9	16	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2154/pdf
1995	inlet	10	18	5.5	Top condition is poor.	trash	3.4	1	2	3	2.32	2	3	1	3.5	2.55	Correct top condition.	5.9	23	50%	1000	http://aapp.apaienv.com/photos/amarillo/1995/pdf
1977	inlet	7.5	18	3.5	Exposed rebar, discharge pipe in poor condition.	trash	3.2	1	1	3	2.06	3	3	1	3.5	2.8	Correct top and discharge pipe condition.	5.8	24	50%	$3,500	http://aapp.apaienv.com/photos/amarillo/1977/pdf
2599	inlet	8	18	5	Top condition is poor.	trash	3	1	2	2	2	3	3	1	3.5	2.8	Correct top condition.	5.6	25	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2599/pdf
2156	inlet	7	20	6	Box and top in poor condition.	trash	3	1	1	2	1.8	3	3	1	3.5	2.8	Correct top and box condition.	5.0	26	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2156/pdf
2161	inlet	11	24	7.75	Throat condition is poor.	trash	3.4	1	3	3	2.52	2	1	2	3.5	1.9	Correct throat condition.	4.8	27	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2161/pdf
1957	inlet	7	24	2.75	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	4	1	2	2.7	3	1	2	1	1.65	Monitor in future as multiple categories were ranked in poor condition.	4.5	28	50%	N/A	http://aapp.apaienv.com/photos/amarillo/1957/pdf
2001	inlet	7	18	6.1	Throat condition is poor.	trash	3.4	1	2	3	2.32	2	1	1	3.5	1.75	Correct throat condition.	4.1	29	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2001/pdf
2003	inlet	10	24	8.5	Throat condition is poor.	trash	3.4	1	2	3	2.32	2	1	1	3.5	1.75	Correct throat condition.	4.1	29	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2003/pdf
2155	inlet	8	20	3	Discharge pipe in poor condition.	trash	3.4	1	1	3	2.12	2	1	1	3.5	1.75	Correct discharge pipe condition.	3.7	31	50%	$500	http://aapp.apaienv.com/photos/amarillo/2155/pdf
3461	inlet	8	20	4.25	Throat condition is poor.	trash	3.4	1	1	3	2.12	2	1	1	3.5	1.75	Correct throat condition.	3.7	31	50%	$500	http://aapp.apaienv.com/photos/amarillo/3461/pdf
2141	inlet	8	18	7.8	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	5	2	2.6	2	1	2	1	1.4	Monitor in future as multiple categories were ranked in poor condition.	3.6	33	50%	N/A	http://aapp.apaienv.com/photos/amarillo/2141/pdf
2592	inlet	8	18	3.67	Inlet has odor concerns.	odor trash	3	1	1	2	1.8	3	1	4	1	1.95	Investigate odor concerns.	3.5	34	50%	$1,000	http://aapp.apaienv.com/photos/amarillo/2592/pdf
2139	inlet	8	18	9.16	N/A	trash	2.4	1	5	2	2.42	2	1	2	1	1.4	N/A	3.4	35	50%	N/A	http://aapp.apaienv.com/photos/amarillo/2139/pdf
2951	inlet	4			Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	Manhole cover will not open.	3	1	3	3	2.4	2	1	1	1	1.25	Monitor in future as multiple categories were ranked in poor condition.	3.0	36	50%	N/A	http://aapp.apaienv.com/photos/amarillo/2951/pdf
2148	inlet	7	18	7.25	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	4	2	2.4	2	1	1	1	1.25	Monitor in future as multiple categories were ranked in poor condition.	3.0	37	50%	N/A	http://aapp.apaienv.com/photos/amarillo/2148/pdf
1997	inlet	9	18	5.25	Box in poor condition.	trash	2.6	1	2	2	1.88	1	1	1	3.5	1.5	Correct box condition.	2.8	38	50%	$4,500	http://aapp.apaienv.com/photos/amarillo/1997/pdf
1980	inlet	8	18	5.5	Inlet has odor concerns.	odor trash	1.8	1	1	2	1.44	3	1	4	1	1.95	Investigate odor concerns.	2.8	39	50%	$2,000	http://aapp.apaienv.com/photos/amarillo/1980/pdf
1969	inlet	8	18	5.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	2	2	2	2	1	1	1	1.25	Monitor in future as multiple categories were ranked in poor condition.	2.5	40	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1969/pdf
1991	inlet	8	18	5.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	2	2	2	2	1	1	1	1.25	Monitor in future as multiple categories were ranked in poor condition.	2.5	40	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1991/pdf
2000	inlet	8	18	5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	2	2	2	2	1	1	1	1.25	Monitor in future as multiple categories were ranked in poor condition.	2.5	40	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2000/pdf
2140	inlet	8	18	5.25	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.		3	1	2	2	2	2	1	1	1	1.25	Monitor in future as multiple categories were ranked in poor condition.	2.5	40	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2140/pdf
3021	inlet	8	18	6	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	2	2	2	2	1	1	1	1.25	Monitor in future as multiple categories were ranked in poor condition.	2.5	40	100%	N/A	http://aapp.apaienv.com/photos/amarillo/3021/pdf
1970	inlet	7	18	5.25	N/A	trash	2.6	1	2	2	1.88	1	1	1	1	1	N/A	1.9	45	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1970/pdf
1940	inlet	7	18	3.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1940/pdf
1941	inlet	7	18	4.75	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1941/pdf
1942	inlet	7	18	4.16	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1942/pdf
1943	inlet	8	18	4	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1943/pdf
1944	inlet	7	18	3.75	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1944/pdf
1945	inlet	8	18	4	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1945/pdf
1949	inlet	6	24	2.75	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1949/pdf
1951	inlet	5.5	24	3	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1951/pdf

							Condition					Criticality						Risk				
Site Name	Structure Type	Throat height (feet)	Lid Size (inches)	Box depth (feet)	Existing and/or Potential Failure Type	Routine Maintenance Items?	Physical Condition 30%	Prior Complaints 30%	Capacity 20%	Maintainability (Replacement Frequency) 20%	Score	Community 25%	Safety and Liability 40%	Environmental and Regulatory 15%	Replacement 20%	Score	Recommendations	Score	Rank	Percentile	Capital Cost (2013 Dollars)*	Site Photos
1952	inlet	7	24	3.25	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1952/pdf
1953	inlet	7	24	3.25	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1953/pdf
1958	inlet	7	24	2.75	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1958/pdf
1959	inlet	6	24	2.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1959/pdf
1962	inlet	7	24	3.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1962/pdf
1971	inlet	8	18	3	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1971/pdf
1972	inlet	8	18	4	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1972/pdf
1975	inlet	8	18	4	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1975/pdf
1985	inlet	8	18	3	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1985/pdf
1999	inlet	7	18	4.25	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1999/pdf
2149	inlet	7	18	6.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2149/pdf
2150	inlet	7	18	3.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2150/pdf
2151	inlet	7	18	4.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2151/pdf
2157	inlet	7	20	5.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2157/pdf
2159	inlet	8	20	5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2159/pdf
2579	inlet	6	18	3.9	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2579/pdf
2589	inlet	8	18	4.75	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2589/pdf
2590	inlet	8	18	4	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2590/pdf
2591	inlet	8	18	4	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2591/pdf
2597	inlet	8	18	3	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2597/pdf
2884	inlet	6	20	1	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2884/pdf
3020	inlet	8	18	3.25	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/3020/pdf
3119	inlet	8	18	4.5	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/3119/pdf
3439	inlet	7	20	5.16	Multiple categories (top, throat, box, and discharge pipe) ranked in fair condition, monitor in future.	trash	3	1	1	2	1.8	1	1	1	1	1	Monitor in future as multiple categories were ranked in poor condition.	1.8	46	100%	N/A	http://aapp.apaienv.com/photos/amarillo/3439/pdf
1986	inlet	8	18	4.5	N/A	trash	2.2	1	2	2	1.76	1	1	1	1	1	N/A	1.8	78	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1986/pdf
2160	inlet	9	18	7.75	N/A	trash	2.2	1	2	2	1.76	1	1	1	1	1	N/A	1.8	78	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2160/pdf
2582	inlet	8	18	5	N/A	trash	2.2	1	2	2	1.76	1	1	1	1	1	N/A	1.8	78	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2582/pdf
1981	inlet	7	18	4.25	N/A	trash	2.6	1	1	2	1.68	1	1	1	1	1	N/A	1.7	81	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1981/pdf
2135	inlet	9	20	3.8	N/A	trash	2.6	1	1	2	1.68	1	1	1	1	1	N/A	1.7	81	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2135/pdf
2137	inlet	9	20	3.33	N/A	trash	2.6	1	1	2	1.68	1	1	1	1	1	N/A	1.7	81	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2137/pdf
2138	inlet	8	18	4.5	N/A	trash	2.6	1	1	2	1.68	1	1	1	1	1	N/A	1.7	81	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2138/pdf
2134	inlet	8	20	2.25	N/A	trash	2.6	1	1	2	1.68	1	1	1	1	1	N/A	1.7	85	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2134/pdf
2883	inlet	8.5	20	3.25	N/A	trash	2.6	1	1	2	1.68	1	1	1	1	1	N/A	1.7	85	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2883/pdf
3438	inlet	7	20	2.5	N/A	trash	2.6	1	1	2	1.68	1	1	1	1	1	N/A	1.7	85	100%	N/A	http://aapp.apaienv.com/photos/amarillo/3438/pdf
1983	inlet	8	20		N/A		1.2	1	3	2	1.66	1	1	1	1	1	N/A	1.7	88	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1983/pdf
2596	inlet	8			N/A	trash	1.2	1	3	2	1.66	1	1	1	1	1	N/A	1.7	88	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2596/pdf
1939	inlet	7	18	4	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1939/pdf
1948	inlet	8	24	2.75	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1948/pdf
1954	inlet	7	24	3	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1954/pdf
1956	inlet	6	24	4.25	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1956/pdf
1979	inlet	8	18	3.67	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1979/pdf
1993	inlet	8	18	5	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1993/pdf
1996	inlet	10	24	3.75	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1996/pdf
2585	inlet	7	20	4.25	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2585/pdf
2587	inlet	8	18	4.75	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2587/pdf
3437	inlet	8	20	2.5	N/A	trash	2.2	1	1	2	1.56	1	1	1	1	1	N/A	1.6	90	100%	N/A	http://aapp.apaienv.com/photos/amarillo/3437/pdf
2580	inlet	8	18	4	N/A	trash	1.8	1	1	2	1.44	1	1	1	1	1	N/A	1.4	100	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2580/pdf
1966	inlet	7	24	4	N/A	trash	1.4	1	1	2	1.32	1	1	1	1	1	N/A	1.3	101	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1966/pdf
1974	inlet	7	18	5.5	N/A	trash	1	1	2	1	1.2	1	1	1	1	1	N/A	1.2	102	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1974/pdf
1978	inlet	8	18	6	N/A	trash	1	1	2	1	1.2	1	1	1	1	1	N/A	1.2	102	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1978/pdf
1982	inlet	7	18	5	N/A	trash	1	1	2	1	1.2	1	1	1	1	1	N/A	1.2	102	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1982/pdf
2938	inlet	7	24	5.5	N/A	trash	1	1	2	1	1.2	1	1	1	1	1	N/A	1.2	102	100%	N/A	http://aapp.apaienv.com/photos/amarillo/2938/pdf
1955	inlet	6	24	3	N/A	trash	1	1	1	1	1	1	1	1	1	1	N/A	1.0	106	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1955/pdf
1961	inlet	6.8	24	3.25	N/A	trash	1	1	1	1	1	1	1	1	1	1	N/A	1.0	106	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1961/pdf
1964	inlet	6.5	24	5.25	N/A	trash	1	1	1	1	1	1	1	1	1	1	N/A	1.0	106	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1964/pdf
1965	inlet	7	24	3.5	N/A	trash	1	1	1	1	1	1	1	1	1	1	N/A	1.0	106	100%	N/A	http://aapp.apaienv.com/photos/amarillo/1965/pdf
3858	inlet	6		3.75	N/A	trash	1	1	1	1	1	1	1	1	1	1	N/A	1.0	106	100%	N/A	http://aapp.apaienv.com/photos/amarillo/3858/pdf

* The prices shown as based on site visit and reconnaissance and on conceptual possible solutions to mitigate deteriorated structures or channels. The investigation did not include sub-surface soil conditions, pipe conditions and TV inspection of these inlets.

CITY OF AMARILLO
MARTIN ROAD LAKE
Storm Water Master Plan Project
Data Collection Criteria Manual

This appendix is provided to document the data collection methodology as well as to provide information on how to access the information collected by the consultants. Although the information has already been collected by the consultant, additional field data can be collected by city staff and stored in the same location. This manual concentrates on required software steps for future data collection. Minimum hardware is required, including a Google Android© smart phone with at least operating system v2.2. If additional GPS accuracy (greater than four meters) is required an additional GPS hardware device is needed. For the purposes of this manual a Wintec G-Rays device is used, but any Bluetooth-enabled GPS receiver should work.

INSTRUCTIONS FOR PREPARING TO USE THE APPLICATION FOR THE FIRST TIME:

1. Access the following website: http://gumdrop.apaienv.com/clients/amarillo/.
2. Log-in using the following information (case sensitive) – Username: coa, Password: coa0458
3. If it is the first time you have collected data on your Android phone, go to Step 4. Otherwise, go to next section.
4. Click on the "Instructions" link, then click on the "Android Application Download" link, and save the link to your computer. The file name is APAI-Collect-1.1.7.2.apk.
5. Adjust your phone settings by clicking on Settings, then Applications, and then allow Unknown Sources.
6. With your phone connected to your computer via a USB connection, transfer APAI-Collect-1.1.7.2.apk to your Android phone.
7. Install the ASTRO file explorer application on your Android phone. ASTRO can be downloaded from https://play.google.com/store/apps/details?id=com.metago.astro&hl=en.
8. Once downloaded, utilize the ASTRO application to locate the APAI-Collect-1.1.7.2.apk file our Android phone's memory. Double click and install the application.

INSTRUCTIONS FOR COLLECTING DATA:

The following information is also documented at:
http://gumdrop.apaienv.com/clients/amarillo/Collect_instructions.pdf

1. Turn on the Bluetooth. (1)
2. Turn on "Wintec G-Rays" (mobile GPS) and click "Change Settings." (1)

3. Click on Bluetooth. When box is checked, hit the back arrow below the Samsung logo on screen. (1)
4. Click on Start. When Start button becomes dark grey, hit the back arrow below the Samsung logo on screen. (1)
5. Open the APAI-Collect-1.1.7.2.apk application.
6. Select "Get Blank Form" and find the form with the most recent revision number (as of the date of this manual it is _v5). Select the form and press 'Get Selected'.
7. Select **"**Fill Blank Form" and follow instructions. Information on scoring is included as part of the project Task C Technical Memorandum.
8. Most form data should be self explanatory. When collecting photo bearing hold the phone either parallel or perpendicular to the ground (not at any angles) – doing this will assist the internal compass to provide an accurate bearing. Note that the photo itself can be taken at any angle.
9. When the application indicates you are at the end of the form, be sure to select "save form and exit."
10. Go back to Step 5 and repeat until you are finished with the data collection for the day.
11. When you have completed the visits for the day, go to "Send Finalized Form" on the main screen and select forms to submit. Hit "send selected."

    (1) Only required if using additional GPS hardware for improved accuracy.

INSTRUCTIONS FOR ACCESSING DATA

1. Access the following website: http://gumdrop.apaienv.com/clients/amarillo
2. Log-in using the following information (case sensitive) – Username: coa, Password: coa0458.

   The following menu items are available under the Home link:

   - The simple map view link provides a basic map displaying inspection locations by asset type.
   - The real-time GIS map link includes a high quality aerial image that displays assets, including inspection information (click on asset to view).
   - The real-time data downloads (excel, PDF, GIS, etc.) link provides inspection information for download in various formats.
   - The real-time data downloads (excel, PDF, GIS, etc.) link provides inspection information for download in various formats.
   - The site visit data provides pictures and meteorological information from a general site visit.

   The following menu items are available under the Instruction Download link:

   - The Android Application Download allows the user to download the data collection application for Android phone.
   - The Basic Collection Method Instructions provides instructions for collection data.