City of Enid

Phase I Update

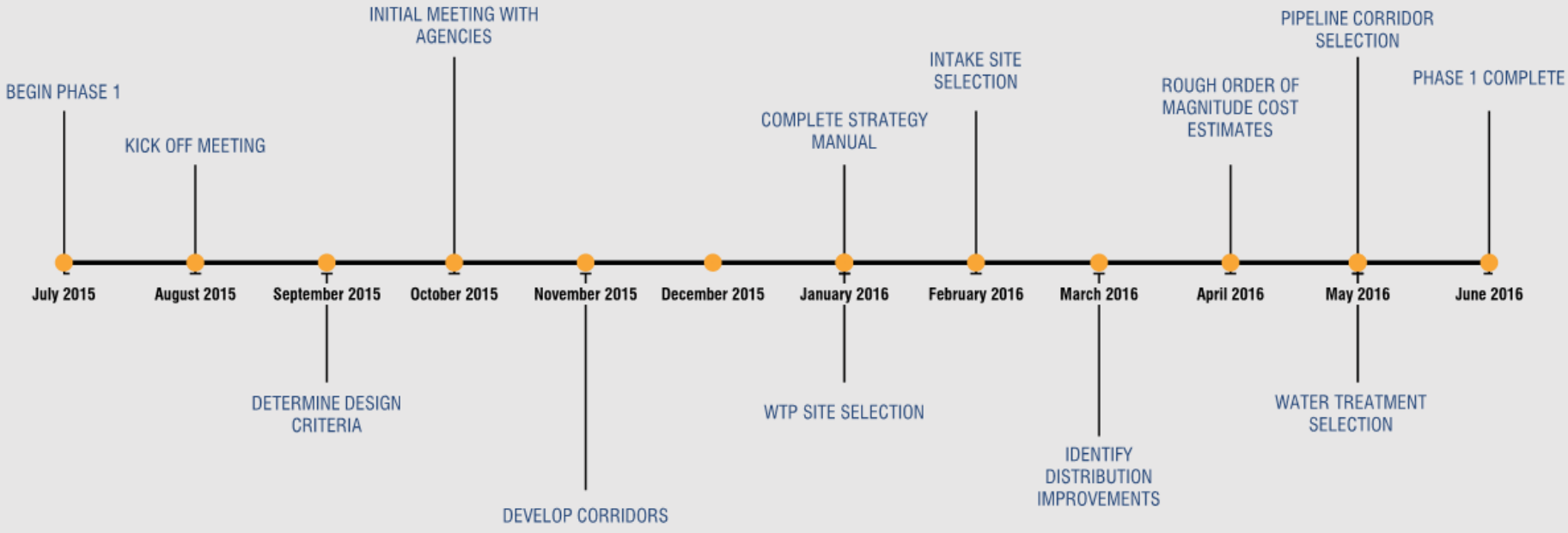
April 19, 2016

Program Segments

- Program Management
- Intake/Pump Station
- Pipeline
- Terminal Storage
- Water Treatment Plant
- Distribution
- Environmental

Program Management

TIMELINE



50 Year Water Supply

- Phase 1 Cost Update Topics
  - Phase I Program Goals
  - Cost Update
  - Cost Estimating
  - Optimal System
  - Phasing Options
  - Schedule

Water Supply to 2072

- Phase I Goals
  - ✓ Establish strong Program Management processes and controls
  - – Initiate Storage Contract, Environmental Review Process, and Permitting
    - ✓Develop required documentation acceptable to USACE for a storage contract
    - ✓Develop a permitting strategy acceptable to USACE
  - – Refine Program Cost and Schedule Estimates
  - – Develop data required for Council to initiate the next phase

Water Demand Projections

	Water Master Plan	Kaw Lake Water Supply
End of Planning Horizon	2050	2072
Average Day Demand	18.4 MGD	19.2 MGD
Maximum Day Demand	33.4 MGD	35.0 MGD

- Agrees with Water Master Plan through the year 2050

Optimal System

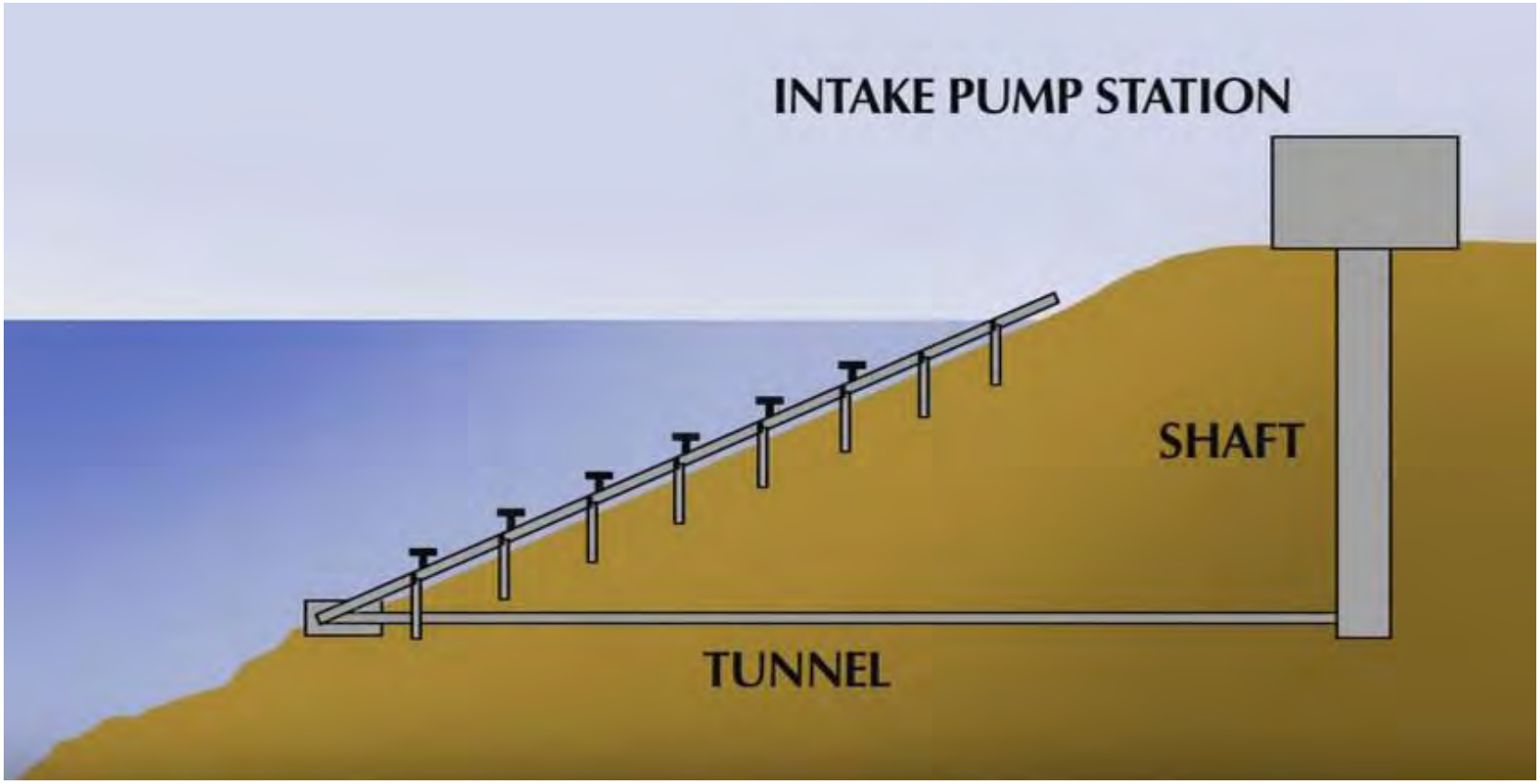
- New multi-level intake
- Direct route
  - Pending completion of environmental review
  - Intermediate Booster Pump Station (BPS)
- Terminal Storage
  - Equalization & Emergency storage
- New water treatment plant – 30 year planned life
- Interfaces/Distribution
  - New finished water storage (Clear wells)
  - Plant interconnect
  - Pump Station Upgrades
  - Balanced East/West

Program Cost Update

Rough Order of Magnitude Cost Estimate

10% Level Concept Design

Intake - Caisson & Microtunnel



Intake

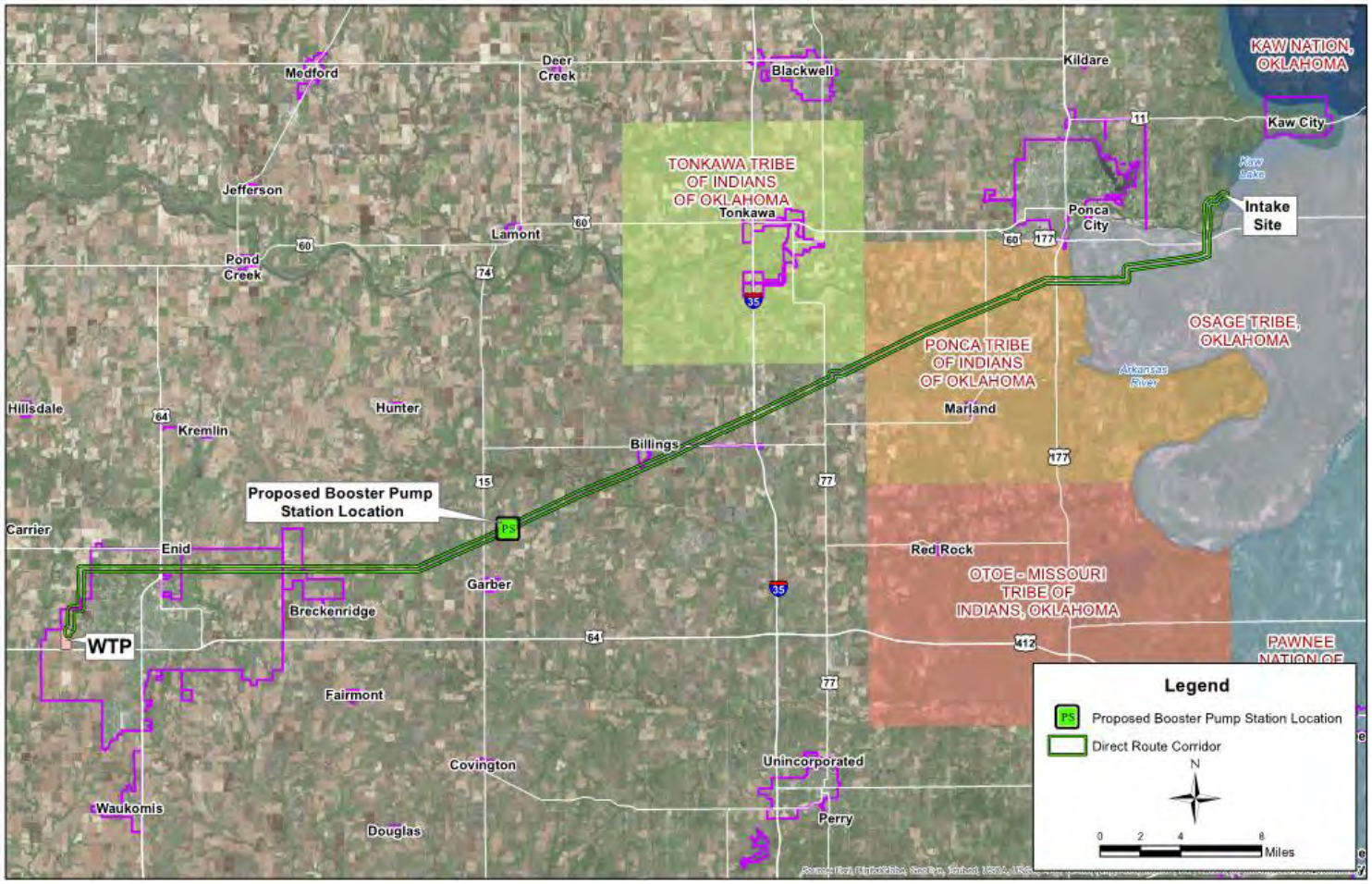
Microtunnel Intake Structure and Pump Station	Cost ($ M)
Power Transmission to Intake	2.8
Emergency Back Up Power (2,500 KW)	2.1
Intake Access Roads (Temp & Permanent)	2.5
Intake Pump Station Civil	0.9
Intake Pump Station Structural	1.8
Intake Pump Station Mechanical	3.1
Intake Pump Station Electrical	1.3
Microtunnel & Related Pipe / Valves / Screens	1.9
Subtotal – Raw Cost	**16.4**
Contractor Mobilization (5%)	0.8
Contractor Overhead and Profit (18%)	3.0
ROM Construction and Land/Easement Cost	**20.2**

Intermediate BPS

Intermediate BPS

Intermediate BPS	Cost ($ M)
Intermediate BPS Civil	0.9
Intermediate BPS Structural	0.8
Intermediate BPS Mechanical	1.8
Intermediate BPS Electrical	1.5
Emergency Back Up Power (2,500 KW)	2.1
Intermediate BPS and Tank Site Work	0.5
Intermediate BPS 5 MG Ground Storage Tank	2.0
Subtotal – Raw Cost	**9.6**
Contractor Mobilization (5%)	0.5
Contractor Overhead and Profit (18%)	1.7
ROM Construction and Land/Easement Cost	**11.8**

Pipeline


Medford
Deer Creek
Blackwell
Kildare
KAW NATION, OKLAHOMA
Kaw City
Kaw Lake
Jefferson
TONKAWA TRIBE OF INDIANS OF OKLAHOMA
Tonkawa
Ponca City
Intake Site
Lamont
Pond Creek
OSAGE TRIBE, OKLAHOMA
PONCA TRIBE OF INDIANS OF OKLAHOMA
Arkansas River
Marland
Hillsdale
Kremlin
Hunter
Billings
Proposed Booster Pump Station Location
PS
Carrier
Enid
Red Rock
OTOE - MISSOURI TRIBE OF INDIANS, OKLAHOMA
Garber
Breckenridge
WTP
PAWNEE NATION OF
Fairmont
Covington
Unincorporated
Waukomis
Douglas
Perry
Legend
Proposed Booster Pump Station Location
Direct Route Corridor
N
0 2 4 8
Miles

Pipeline

Raw Water Pipeline	Cost ($ M)
36-Inch Pipeline	69.6
Tunneled Crossings	13.3
Arkansas River Crossings	3.7
Open Cut Creek Crossings	0.9
Trench Safety	0.4
Air Release Valves	1.8
Butterfly Valves	0.8
Blow Off Valves	1.8
Access Manways	0.5
Cathodic Protection	0.7
Pipeline Row Clearing	0.4
Fiber Optic & Conduit	2.7
Surface Restoration	1.5
Testing	0.7
Subtotal – Raw Cost	**98.8**
Contractor Mobilization (5%)	5.0
Contractor Overhead and Profit (18%)	17.8
ROM Construction and Land/Easement Cost	**121.6**

Terminal Storage Reservoirs

- EQ TSR
  - 2 Cells
  - Approx 20 Acres
  - Low-Lift Pump Station
- EM TSR
  - 1 Cell
  - Approx 60 Acres
  - Re-Lift Pump Station
  - 36-inch Pipeline

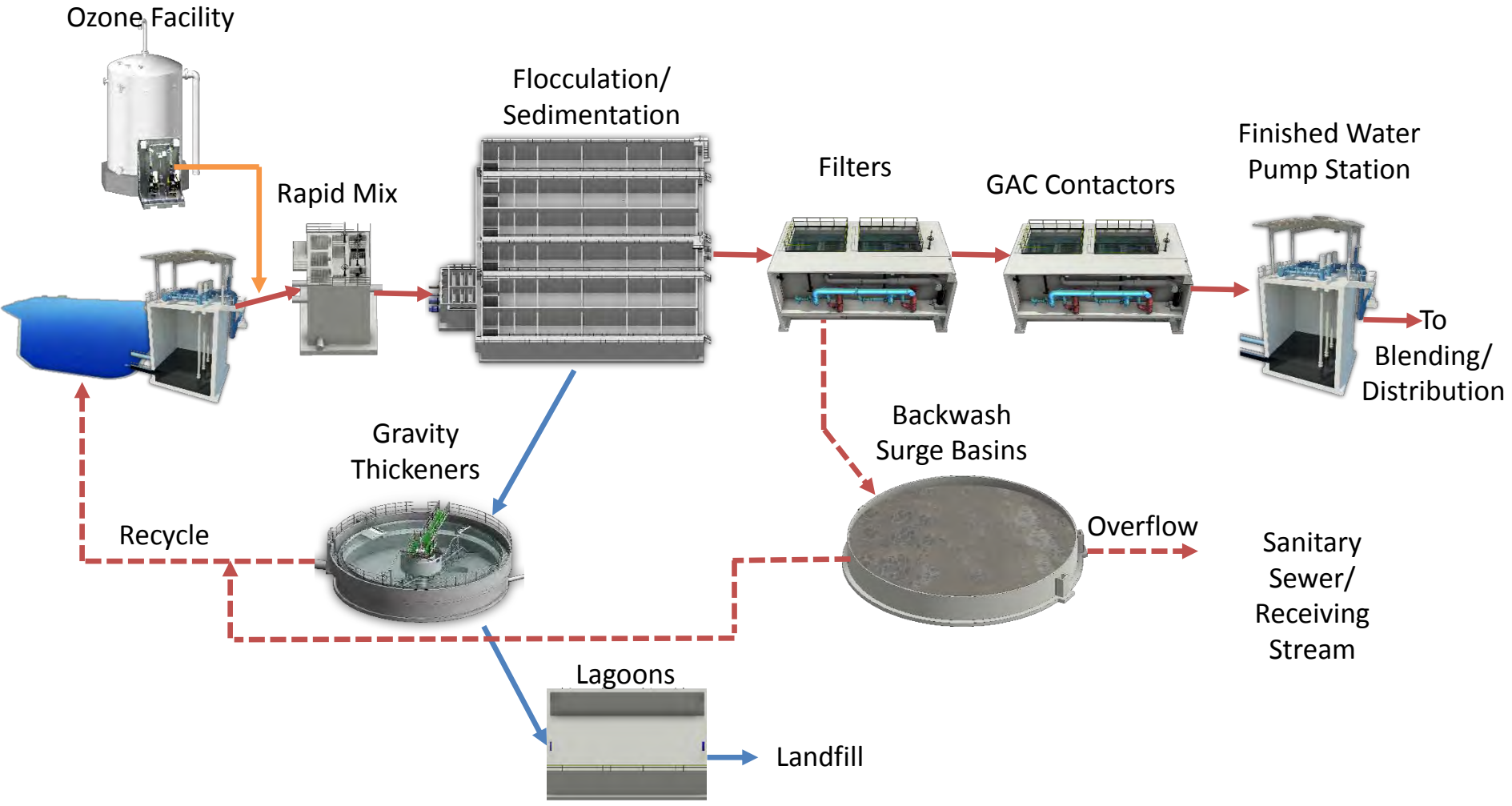
EQ Terminal Storage Reservoir

Equalization Terminal Storage Reservoir	Cost ($ M)
TSR EQ Low-Lift Pump Station Civil	0.3
TSR EQ Low-Lift Pump Station Structural	0.6
TSR EQ Low-Lift Pump Station Mechanical	0.8
TSR EQ Low-Lift Pump Station Electrical	1.1
TSR Equalization Storage Facility	10.7
Subtotal – Raw Cost	13.5
Contractor Mobilization (5%)	0.7
Contractor Overhead and Profit (18%)	2.4
ROM Construction and Land/Easement Cost	16.6

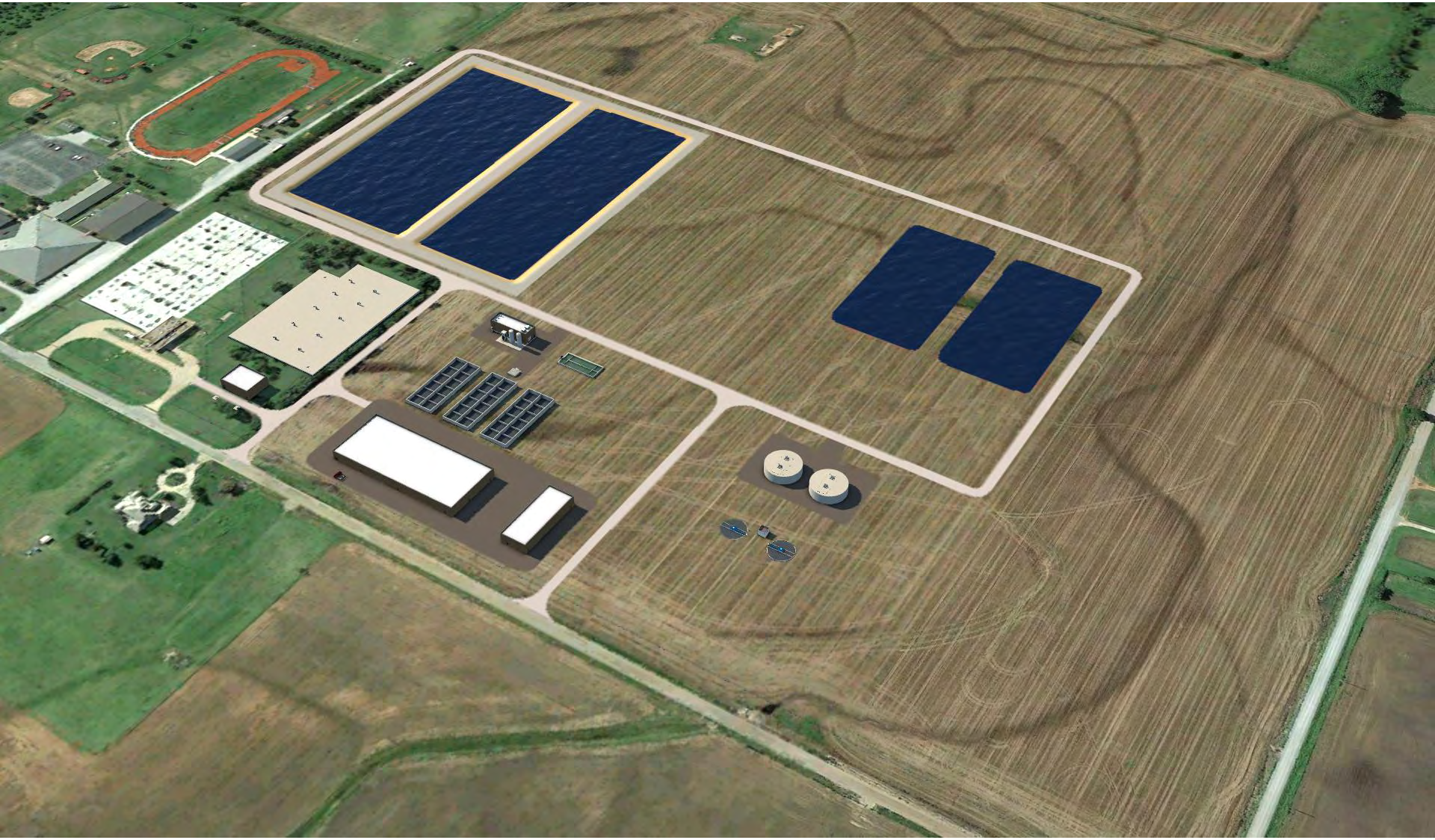
EM Terminal Storage Reservoir

Emergency Terminal Storage Reservoir	Cost ($ M)
TSR EM Re-Lift Pump Station Civil	0.6
TSR EM Re-Lift Pump Station Structural	0.7
TSR EM Re-Lift Pump Station Mechanical	0.8
TSR EM Re-Lift Pump Station Electrical	1.0
TSR Equalization Storage Facility	16.3
Piping from TSR EM to Raw Water Pipeline	1.0
Subtotal – Raw Cost	**20.4**
Contractor Mobilization (5%)	1.0
Contractor Overhead and Profit (18%)	3.7
ROM Construction and Land/Easement Cost	**25.1**

Water Treatment Plant



Water Treatment Plant

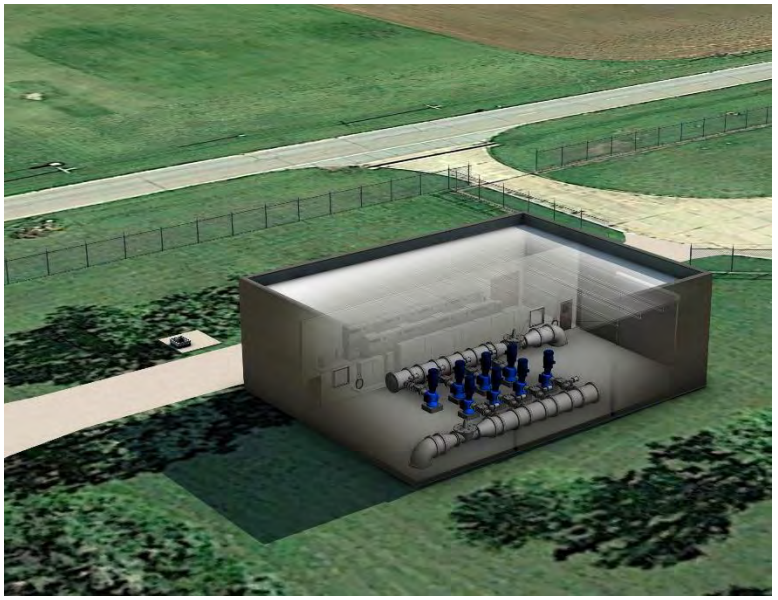


Water Treatment Plant

Conventional WTP w/ Post-Filtration GAC	Cost ($ M)
Finished Water Lift Station	3.3
Ozone Facility	8.8
Bulk Chemical Storage and Feed	4.9
Rapid Mix/Flow Split	0.6
Flocculation/Sedimentation Basins	8.1
Filters	9.1
Post-Filtration GAC Contactors	11.0
Backwash Supply	2.8
Wash Water Surge Basins	1.3
Gravity Thickeners	1.3
Lagoons	1.1
Operations/Maintenance Building	1.5
Subtotal – Raw Cost	**53.8**
Contractor Mobilization (5%)	2.7
Contractor Overhead and Profit (18%)	9.7
ROM Construction and Land/Easement Cost	**66.2**

Distribution – High Service Pumps

- Single PS for East and West Pressure Planes
  - East
    - 3 duty + 1 stand-by
    - 400 HP (each)
  - West
    - 3 duty + 1 stand-by
    - 300 HP (each)



Distribution – High Service Pumps

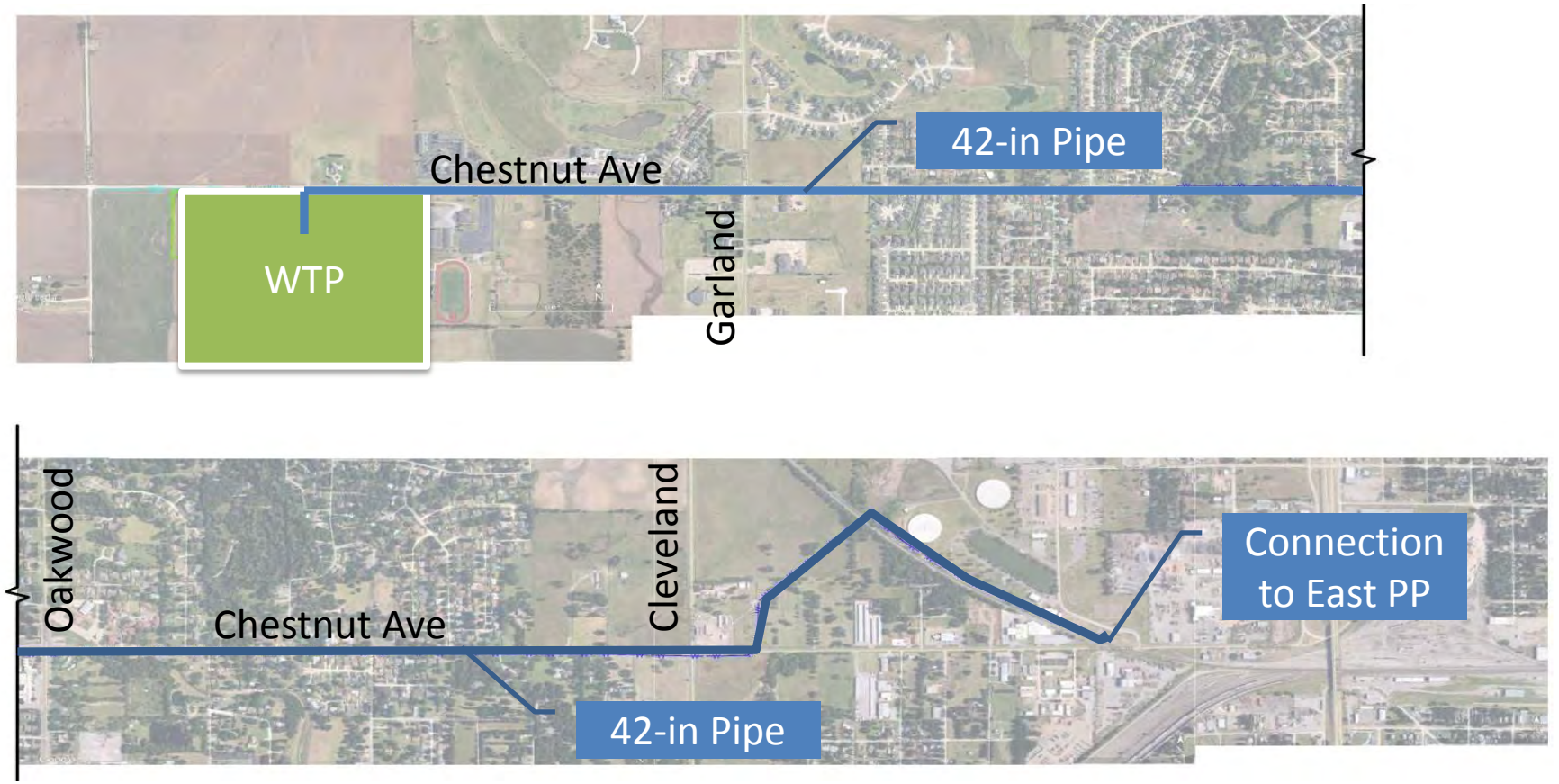
High Service Pump Station	Cost ($ M)
High Service Pump Station Civil	1.0
High Service Pump Station Structural	1.4
High Service Pump Station Mechanical	4.1
High Service Pump Station Electrical	3.4
Emergency Back Up Power (1,050 KW)	0.8
Subtotal – Raw Cost	**10.7**
Contractor Mobilization (5%)	0.5
Contractor Overhead and Profit (18%)	1.9
ROM Construction and Land/Easement Cost	**13.1**

Distribution – Storage

- New 8 MG Ground Storage Tank (GST)
  - Blend surface and groundwater
  - Flexible operations

Distribution – Pipeline

- 3.5-mi of 42-inch Ductile Iron Pipe to East Pressure Plane



Distribution – Integration & Storage

East Pressure Plane Connection and Clearwell	Cost ($ M)
Demo Existing Ground Tanks and Chemical Buildings	0.5
8 MGD Clearwell	7.2
East Pressure Plane Distribution Line	5.7
Subtotal – Raw Cost	**13.4**
Contractor Mobilization (5%)	0.7
Contractor Overhead and Profit (18%)	2.4
ROM Construction and Land/Easement Cost	**16.5**

Total Infrastructure Cost

Facility	Cost ($ M)
Microtunnel Intake Structure and Pump Station	20.2
Intermediate BPS	11.8
Raw Water Pipeline	121.6
Equalization TSR	16.6
Emergency TSR	25.1
Conventional WTP w/ Post-Filtration GAC	66.2
High Service Pump Station	13.1
East Pressure Plane Integration and Clearwell	16.5
Subtotal – Construction and Land Costs	**291.1**

Program Execution and Design (PED)

- Program Management
  - Oversight & Coordination
  - Scheduling
  - Cash Flow Projections
  - Reporting
  - Design Standards
- Planning
  - Environmental
  - NEPA
  - Public Involvement
  - Permitting
- Design
  - Survey
  - Conceptual Design
  - Preliminary Design
  - Final Design
  - Geotechnical Investigations
- Land Acquisition
  - Legal descriptions
  - Conveyance Instruments
  - Appraisals
  - Negotiations
  - Condemnations
- Construction Phase
  - Bidding
  - Contract Management
  - Submittal Review
  - Plan Revisions
  - Construction Inspection
  - Material Testing
- Post Construction Phase
  - Start-up Services
  - O&M Manuals
  - Operator Training
  - Warranty Assistance

Total Infrastructure Cost

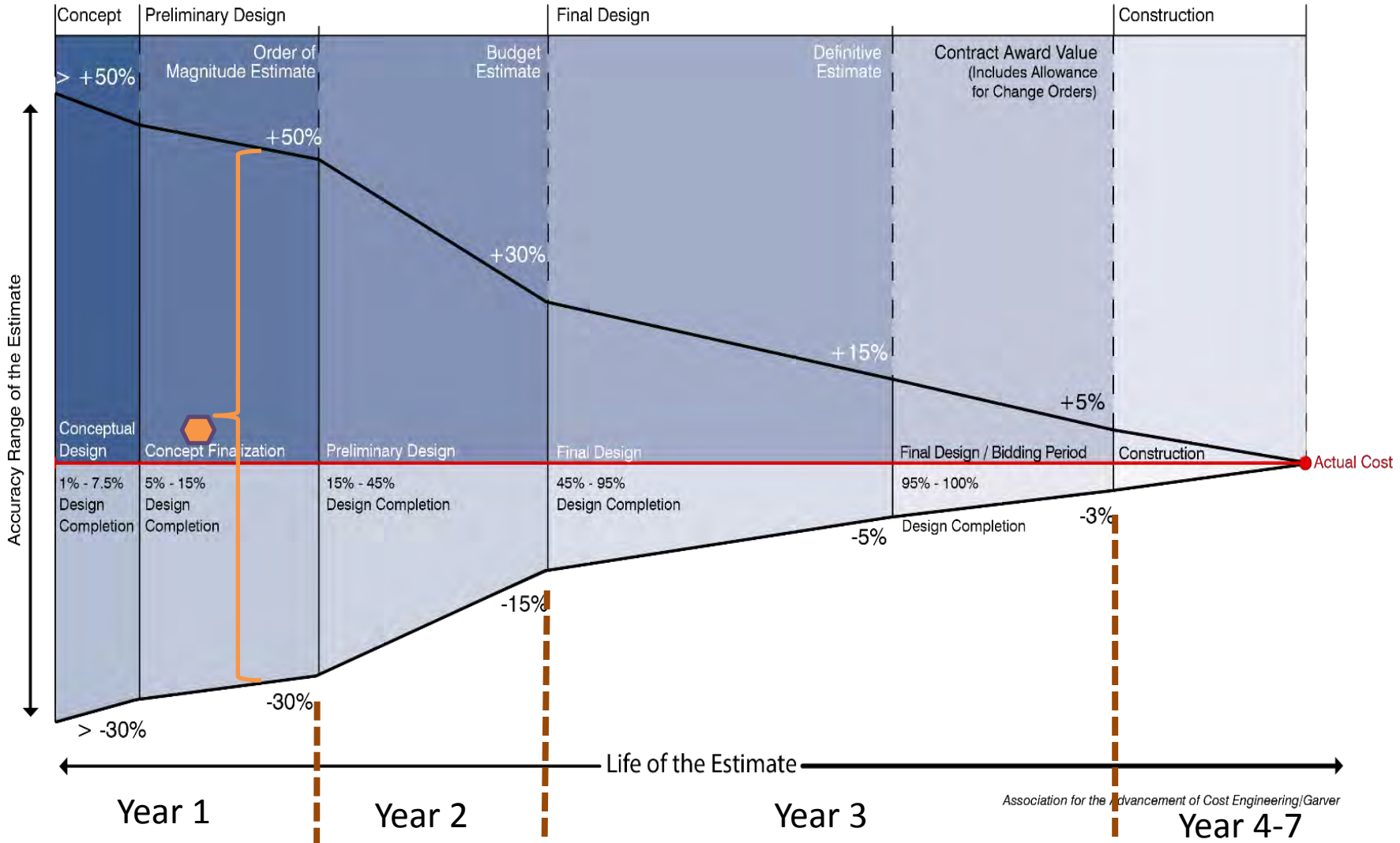
Facility	Cost ($ M)
Microtunnel Intake Structure and Pump Station	20.2
Intermediate BPS	11.8
Raw Water Pipeline	121.6
Equalization TSR	16.6
Emergency TSR	25.1
Conventional WTP w/ Post-Filtration GAC	66.2
High Service Pump Station	13.1
East Pressure Plane Integration and Clearwell	16.5
Subtotal – Construction and Land Costs	**291.1**
Program Execution and Design (PED) (25%)	73.0
Subtotal – Construction, Land, & PED	**364.1**

Total Infrastructure Cost

Facility	Cost ($ M)
Microtunnel Intake Structure and Pump Station	20.2
Intermediate BPS	11.8
Raw Water Pipeline	121.6
Equalization TSR	16.6
Emergency TSR	25.1
Conventional WTP w/ Post-Filtration GAC	66.2
High Service Pump Station	13.1
East Pressure Plane Integration and Clearwell	16.5
Subtotal – Construction and Land Costs	**291.1**
Program Execution and Design (PED) (25%)	73.0
Subtotal – Construction, Land, & PED	**364.1**
Recommended Contingency (30%)	87.4
Total Rough Order of Magnitude Cost Estimate	**451.5**

Estimate Accuracy Range

through Project Development



Phasing Opportunities

Reductions in initial Program capital investment

Doesn’t comprise future full build-out capacity

Phased Approach

- Design the Optimal solution with phased opportunities
  - Everything that is phased will be represented as bid alternates.
  - If bid time market conditions are favorable these phased, or bid alternates, might be affordable.
  - If phased items are not funded those items will have to be constructed in the future to meet full flow capacity.

Intake

- Potential Phased Construction
  - Defer Construction of Back Up Generator
  - Defer Installation of 1 of the 3 Pumps
    - Risk: No back-up power for weather related events

Reduces Construction Costs by $4,200,000
Reduces intake flow 16.0 MGD

Pipeline and Intermediate BPS

- Potential Phased Construction
  - Defer construction of Intermediate BPS
    - Requires modifications to pipeline material
    - Risk: Increased reliance on well field to meet max day demand

Reduces Construction Costs by $8,700,000
Reduces pipeline flow 12.2 MGD

EQ Terminal Storage Reservoir

- Potential Phased Construction
  - Reduce volume of EQ TSR by 33%
    - Risk: Increased reliance on well field to meet max day demand

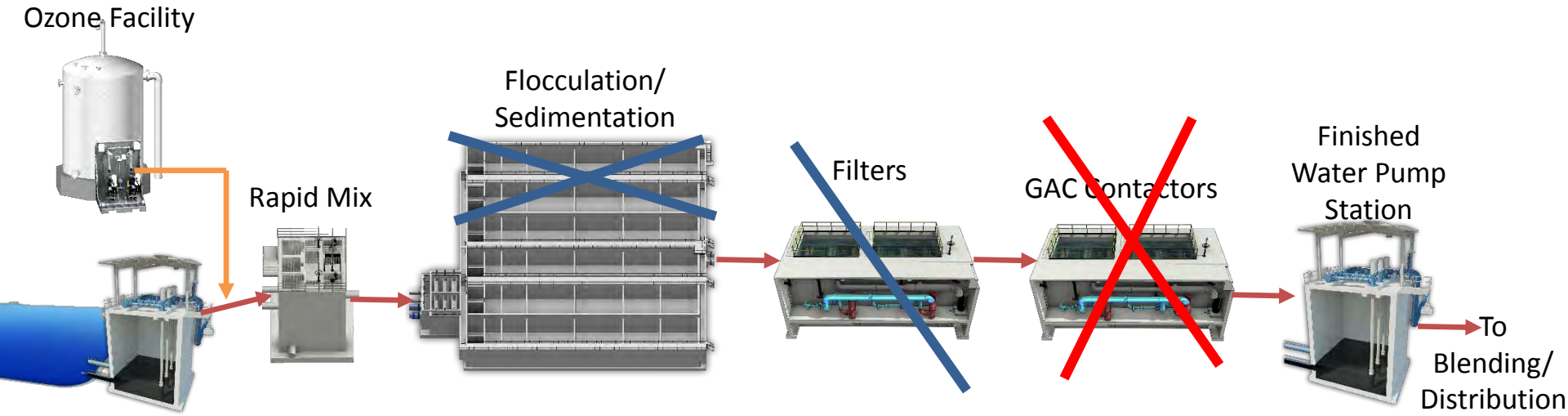
Reduces Construction Costs by $3,700,000

EM Terminal Storage Reservoir

- Potential Phased Construction
  - Reduce volume of EM TSR by 50%
  - Reduce the area of soil/cement liner
    - Risk: Will increase potential for bank erosion requiring more maintenance
    - Risk: Will increase emergency pipeline repair response

Reduces Construction Costs by $9,900,000
Reduces Storage from 14 to 7 days

Water Treatment Plant



- Risk: Reduced treatment barrier for Disinfection-by-products
- Risk: Reduced treatment barrier for Taste and Odor

Reduces Construction Costs by $12,000,000
Reduces Design Flow to 14 MGD

Distribution Improvements

- Potential Phased Construction
  - Defer installation of 1 of the 4 West Pressure Plane Pumps
  - Defer installation of 1 of the 4 East Pressure Plane Pumps
  - Risk: May impair the systems ability to meet future peak hour demand

Reduces Construction Costs by $1,300,000

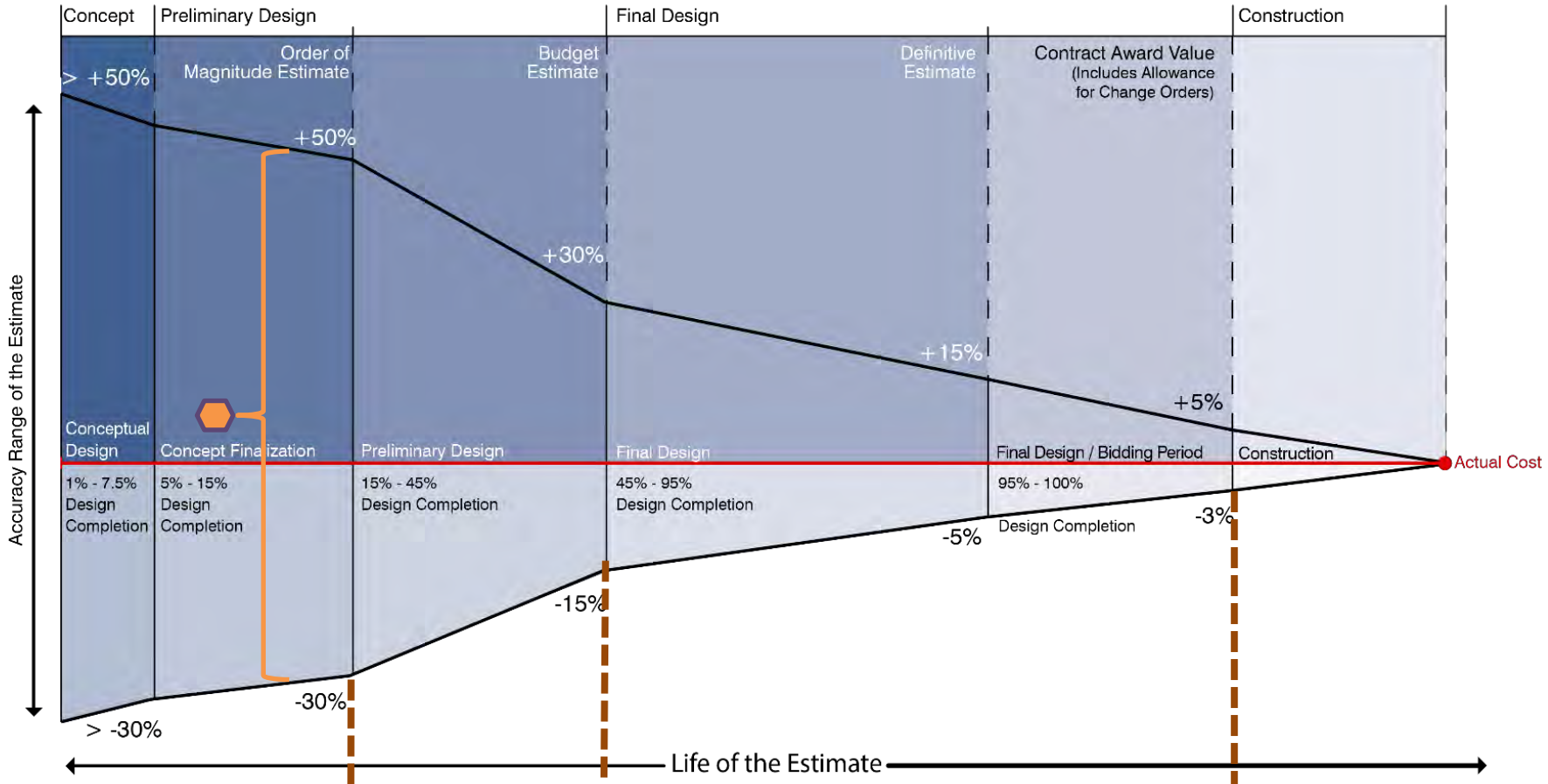
Total Infrastructure Cost with Potential Phasing

Facility	Cost ($ M)
Microtunnel Intake Structure and Pump Station	16.0
Intermediate BPS	0.0
Raw Water Pipeline	124.6
Equalization TSR	12.9
Emergency TSR	15.2
Conventional WTP w/ Post-Filtration GAC	54.2
High Service Pump Station	11.8
East Pressure Plane Integration and Clearwell	16.5
Subtotal – Construction and Land Costs	**251.2**
Program Execution and Design (PED) (25%)	62.8
Subtotal – Construction, Land, & PED	**314.0**
Recommended Contingency (30%)	75.4
Total Rough Order of Magnitude Cost Estimate	**389.4**

Defer $61.8M in Capital Costs
Delivers Capacity of 14 MGD

Estimate Accuracy Range

through Project Development



Estimated Funding Requirement	Year 1	Year 2	Year 3	Year 4-7
	$1.2M	$20 - 25M	$40 - 50M	$330-375M

Estimated Funding Requirement

Year 1 $1.2M	Year 2 $20 - 25M	Year 3 $40 - 50M	Year 4-7 $330-375M
Preliminary Program Planning Conceptual Design Development	Program Management • Controls • Monitoring • Reporting • Funding Coordination • Regulatory Coordination • Scheduling • Land Negotiation • Design Consultant Standards Preliminary Design (30%) Survey Geotechnical Environmental (NEPA) Permitting USACE Storage Contract	Program Management • Controls • Monitoring • Reporting • Funding Coordination • Regulatory Coordination • Scheduling • Sec 408 Permitting • USACE Real Estate • Design Consultant Selection Final Design (100%) Survey Geotechnical Environmental Permitting Land Purchase	Program Management • Controls • Monitoring • Reporting • Funding Coordination • Regulatory Coordination • Scheduling Project(s) Bidding Project(s) Construction Construction Management Construction Observation Commissioning Closeout

Program Funding Options

- Option 1: Fund contingency with cash for the optimal Program
  - Approximately $451M Program – Full Buildout Capacity of 21 MGD
    - Recommended contingency - $87.4M

- Option 2: Deduct phased opportunities as the program progresses (30%, 100%, Bidding)
  - Approximately $390M Program – 14 MGD Capacity
  - Allows full development of Program capacity in the future
    - Recommended contingency - $75.4M

Schedule

- Phase 2 Scope of Work and schedule is unchanged by infrastructure phasing opportunities.
  - Anticipate 30% plans for the Optimal Program in 12-months regardless of phasing decisions
  - To maintain Program Schedule, Phase 2 need to be initiated by July 1, 2016
- Final design phasing at the 30% review will have minimal impact
- Construction can have some impacts to schedule depending on infrastructure decisions

Water Supply to 2072

Phase I Goals

- Establish strong Program Management processes and controls
- Initiate Storage Contract, Environmental Review Process, and Permitting
  - ✓Develop required documentation acceptable to USACE for a storage contract
  - ✓Develop a permitting strategy acceptable to USACE
- Refine Program Cost and Schedule Estimates
- Develop data required for Council to initiate the next phase

City of Enid

Phase I Update

April 19, 2016

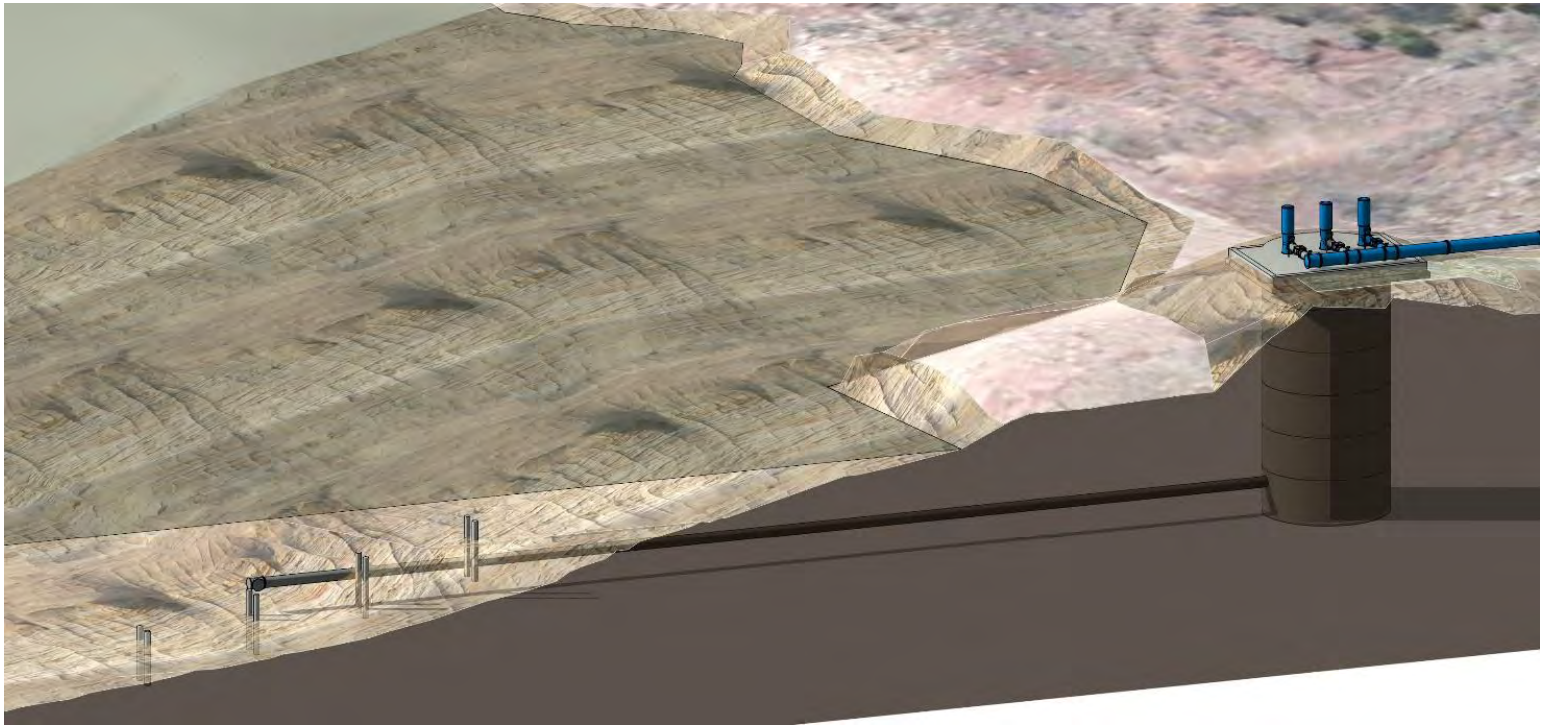
Cost Update

Water Master Plan	Kaw Lake Water Supply
$214 M	$346 M*
18.4 MGD	19.2 MGD
33.4 MG Peak	35 MG Peak
Up to 48-inch pipeline	TBD
57 Miles	66 Miles

*Note: Current staff estimate only as of February 2016

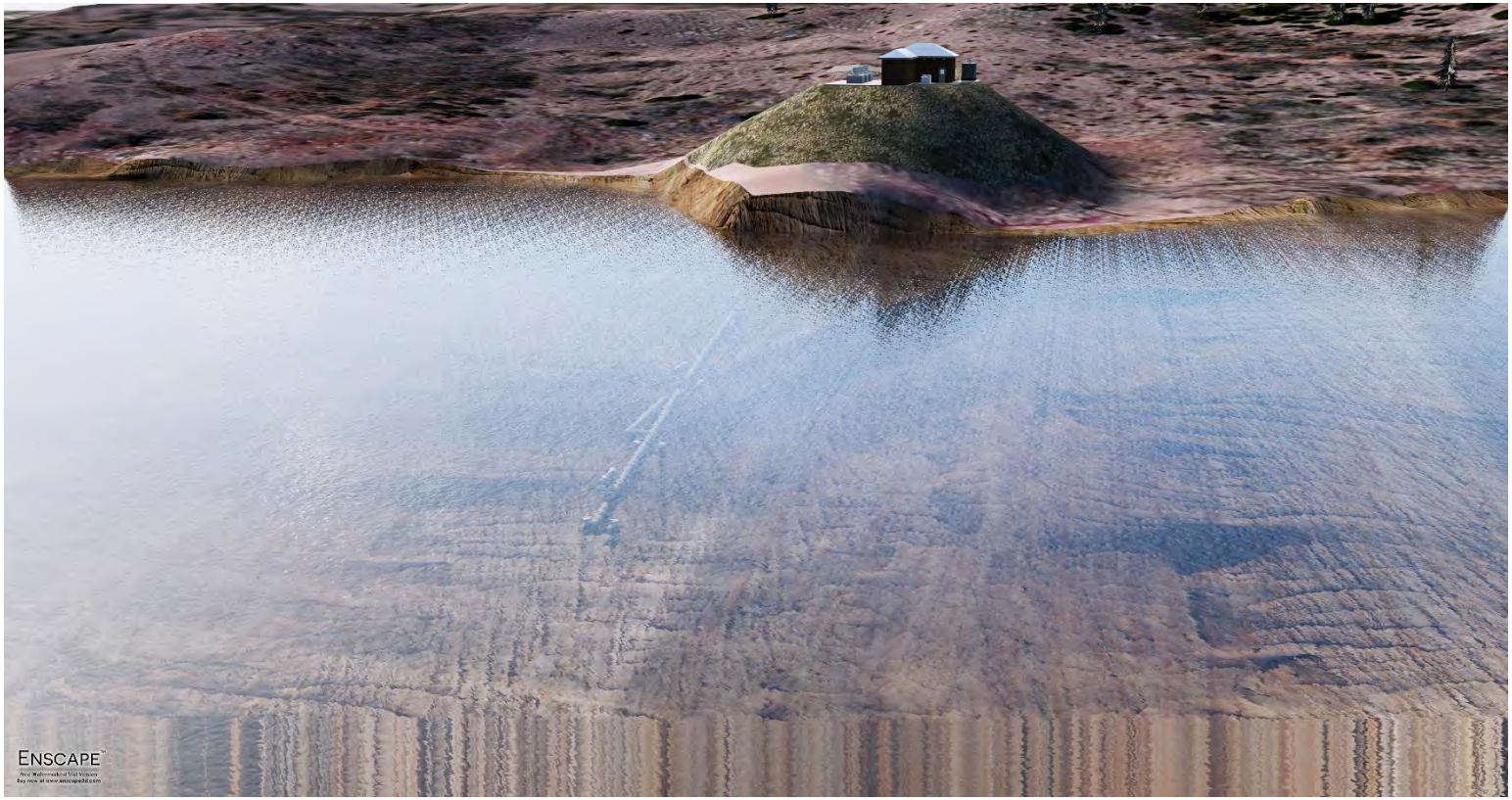
MGD - Million Gallons per Day
MG - Million Gallons
TBD - To Be Determined

Intake



Intake

Intake



Intake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