NEW BRAUNFELS UTILITIES
Capital Improvement Program

$16 MILLION TO $250 MILLION IN FIVE YEARS FLAT

presented by:
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Mike Short, P.E.  NEW BRAUNFELS UTILITIES

April 25, 2018
Texas Water 2018
Location & Growth

Map showing locations of Dallas/Ft. Worth, Houston, San Antonio, Austin, and New Braunfels.

Graph showing historical and projected water connections from 2003 to 2038.

Key:
- Historical
- Projected

Water Connections

Year
2003 2008 2013 2018 2023 2028 2033 2038

0 10,000 20,000 30,000 40,000 50,000 60,000 70,000 80,000
New Braunfels Utilities (NBU)

- 27,810 Water Customers
- 24,775 Wastewater Customers
- 90 square miles
- 17,500 ac-ft of Firm Water Supply
A Viable, Long-Term Capital Improvement Program Starts with a Good Plan
2016 W & WW Master Plan

Growth / Demand Projections
2016 W & WW Master Plan

System Inventory & Hydraulic Modeling
2016 W & WW Master Plan

Table 6-1: Capital Improvements Project Summary

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Total Cost</th>
<th>NBIC Fund</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>5 MGD Gravity Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$352,000</td>
<td>148,000</td>
</tr>
<tr>
<td>2.</td>
<td>4 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$325,000</td>
<td>125,000</td>
</tr>
<tr>
<td>3.</td>
<td>3 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$180,000</td>
<td>70,000</td>
</tr>
<tr>
<td>4.</td>
<td>2 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$125,000</td>
<td>50,000</td>
</tr>
<tr>
<td>5.</td>
<td>1 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$75,000</td>
<td>30,000</td>
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<tr>
<td>6.</td>
<td>1 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$50,000</td>
<td>20,000</td>
</tr>
<tr>
<td>7.</td>
<td>Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$325,000</td>
<td>125,000</td>
</tr>
<tr>
<td>8.</td>
<td>5 MGD Gravity Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$55,000</td>
<td>25,000</td>
</tr>
<tr>
<td>9.</td>
<td>4 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$40,000</td>
<td>10,000</td>
</tr>
<tr>
<td>10.</td>
<td>3 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$25,000</td>
<td>5,000</td>
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<tr>
<td>11.</td>
<td>2 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$15,000</td>
<td>2,000</td>
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<tr>
<td>12.</td>
<td>1 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$10,000</td>
<td>1,000</td>
</tr>
<tr>
<td>13.</td>
<td>1 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$5,000</td>
<td>500</td>
</tr>
<tr>
<td>14.</td>
<td>1 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$2,000</td>
<td>200</td>
</tr>
<tr>
<td>15.</td>
<td>1 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$1,000</td>
<td>100</td>
</tr>
<tr>
<td>16.</td>
<td>1 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$500</td>
<td>50</td>
</tr>
<tr>
<td>17.</td>
<td>1 in. Watermain, Fire Hydrant (Paradise Blvd)</td>
<td>$25</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Total 2016 - 2020

Water System Project Costs

2026 - 2040

OPINION OF PROBABLE COST

Construction Project Number: 27

Project Description: South WTP 10.00 MGD Expansion (Downtown P2)

Detailed Description: This project expands the South water treatment plant (WTP) treatment and distribution pumping (firm) capacity to 18.00 mgd.

Purpose: This project will provide additional supply capacity and will serve future growth in the Downtown P2. Without this project, the water distribution system will not have adequate production capacity to meet 2040 maximum day demand.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
<th>UNIT</th>
<th>UNIT PRICE</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>10.0 MGD WTP Expansion</td>
<td>1</td>
<td>LSI</td>
<td>$45,000,000</td>
<td>$45,000,000</td>
</tr>
<tr>
<td>2</td>
<td>12.0 MGD Pump Station</td>
<td>1</td>
<td>LSI</td>
<td>$8,500,000</td>
<td>$8,500,000</td>
</tr>
</tbody>
</table>

Total 2026 - 2040

$76,906,250

PROJECT TOTAL

$76,906,250

Capital Improvements
2016 W & WW Master Plan

80+ projects
(20 years)

$550 million

Next 5 years - $256 million
NBU Challenges

- Program Scale
- Project Complexity
- Limited Staff
- Lack of Standards
NBU Challenges

Program Scale

Project Complexity

Limited Staff

Lack of Standards

![Bar Graph](image)

- **Projected Actual Spending**
- **CIP Budget**

<table>
<thead>
<tr>
<th>Fiscal Year</th>
<th>Amount in Million Dollars</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>10</td>
</tr>
<tr>
<td>2015</td>
<td>30</td>
</tr>
<tr>
<td>2016</td>
<td>20</td>
</tr>
<tr>
<td>2017</td>
<td>35</td>
</tr>
<tr>
<td>2018</td>
<td>70</td>
</tr>
<tr>
<td>2019</td>
<td>50</td>
</tr>
<tr>
<td>2020</td>
<td>40</td>
</tr>
<tr>
<td>2021</td>
<td>30</td>
</tr>
<tr>
<td>2022</td>
<td>20</td>
</tr>
</tbody>
</table>

Projected Actual Spending x 4
NBU Challenges

Program Scale

- Membrane WTP
- ASR Water Supply System
- Reuse Feasibility Study
- AMI Water Meter Changeout
- 2 Emergency CMAR Projects

Project Complexity

WATER - $111M

- Membrane WTP
- ASR Water Supply System
- Reuse Feasibility Study
- AMI Water Meter Changeout
- 2 Emergency CMAR Projects

WASTEWATER - $145M

- Greenfield WWTP
- Flow Metering Study
- Major WWTP Expansion
- Misc Lift Station & Pipeline Rehab

Limited Staff

Lack of Standards
NBU Challenges

Program Scale

Project Complexity

Limited Staff

Lack of Standards

2016/2017 Staffing

Admin Assist.

Water Director

NEW

Retirement

Chief Engineer

NEW

To CEO

Project Manager

NEW

Resigned

Project Engineer

NEW

Developer Focus
NBU Challenges

Program Scale

Project Complexity

Limited Staff

Lack of Standards

- Complex Document Management System to Find Info
- Limited Standards Existed
- Standards Did Have Were Located in Different Places
- Could Not Determine What Was Current
External Program Management

Resource Planning & Hiring

Staff Augmentation

Standard Processes & Templates

Capital Project Delivery Strategy
External Program Management

Staff Augmentation

Resource Planning & Hiring

Standard Processes & Templates

Capital Project Delivery Strategy
External Program Management

- Collection & consolidation of data
- Approval for Expenditure (AFE) for every project
- Spreadsheet-based Project Management Information System (PMIS)
- Web-based CMIS
- Program coordination/tracking process
PMIS

Data Input

CNB project (6/22/2017) Review funding, CNB saw

Reporting

Status Summary  CashFlow  ActualCosts  Program Dashboard
Program Reporting

**NBU WWCPDP - Monthly Construction Spending**

**Budget vs Projected Spending**

<table>
<thead>
<tr>
<th></th>
<th>Budgeted Cost, $Mil</th>
<th>Projected Cost, $Mil</th>
<th>Variance, $Mil</th>
<th>Percent of Budgeted</th>
</tr>
</thead>
<tbody>
<tr>
<td>FY 18</td>
<td>$60.8</td>
<td>$43.1</td>
<td>-$17.6</td>
<td>71%</td>
</tr>
<tr>
<td>5-Yr CIP</td>
<td>$256.5</td>
<td>$262.7</td>
<td>$6.2</td>
<td>102%</td>
</tr>
</tbody>
</table>

**FY18 Spending vs Budget**

- Budgeted Cumm: Blue line
- Projected Cumm: Green line
- Actual Cumm: Red line

**WATER & WASTEWATER PROJECTS**

- Granua WWTP Relocation & Expansion (74-86)
- Dave Crossing Sewer Upgrade
- Auker/Bu Sheet Replacement
- Rellis Lift Station Bar Screen Addition
- North Kuebler 13" Interceptor Upgrade
- North Kuebler 36" Interceptor Upgrade
- Aging System Rehabilitation-WW
- Arvilo Line Improvements (CNB-WW)

**Construction Status**

- Design Completion
- Advertise Date
- Construction NTP
- Construction Complete
- Design Contract To Board
- Construction Contract To Board

**Design Completion**

- Project under design
- Project under construction
- Project completed

**Construction NTP**

- 60% design complete
- 90% design complete
- 100% design complete

**Construction Complete**

- Project completed
- Project under construction
- Project under design

**Design Contract To Board**

- Design contract to be issued
- Design contract in progress
- Design contract issued

**Construction Contract To Board**

- Construction contract to be issued
- Construction contract in progress
- Construction contract issued
Program Coordination

- Action item logs
- Internal weekly status meetings
- Monthly design meetings w/ designers
- Project status reports from designers
Capital Project Delivery Strategy

- External Program Management
- Resource Planning & Hiring
- Standard Processes & Templates

- Staff Augmentation
Staff Augmentation

On-Site Staff

- Program Manager
- Project Manager
- Construction Manager (partial on-site)

On-Call Technical Services

- Owner’s Representative for Alternative Delivery projects
- On-Call Hydraulic Modeling
- Cost Estimating
- Constructability Review
Resource Planning & Hiring

NBU W/WW CIP
Project PM Requirements

PMFTES

Spending

FTE Large Projects

Remaining Projects
Water Systems Engineering (2017 Mid-year)

Chief Engineer  
(M. Short)

Administrative Assistant  
(A. Zimmerman)

Development Support

Senior Engineer  
(Vacant) *1

Water Systems Tech.  
(D. Ayala)

Graduate Engineer  
(vacant)

Graduate Engineer  
(H. Shadrock)

Backflow Specialist  
(B. Cunningham)

Capital Projects

Project Engineer (PE)  
Staff Augmentation  
Existing  
External
External Program Management

Staff Augmentation

Resource Planning & Hiring

Capital Project Delivery Strategy

Standard Processes & Templates
## Standards Docs & Templates

### Flowchart
- List of Standards
- I.D. Existing Standards
- New Standards-Draft
- NBU Review
- Finalize and Roll-Out
- Continuous Improvement

### Initiation/Planning
- Approval for Expenditure
- 5-Year CIP
- Project Setup Form
- Project Mgmt Plan

### Execution – Design
- Contracts
- Scope/Fee
- Details & Specifications
- Front-End Documents
- Vendor Invoices
- General Correspondence
- Engineering Status Reports

### Execution – Construction
- Advertisement Language
- Contracts
- Pay Applications
- Change Orders
- RFI, Change Order & Submittal Logs
- Daily Observation Report

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*NB: Continuously improving standards and processes.*
Standard Processes

- Overall Capital Project Delivery Process
- Procurement & Contract Management
- Land Acquisition
- Construction Inspection / Management
- Quality Management
Successes & Challenges

Successes
• Grew internal staff from 5 to 9 over six-months
• Over 40 projects underway -> $200 million+
• ~$40 million in FY 18 = 2.5 times FY 17.
• Fast-track projects totaling over $25 million using CMAR
• 50% percent complete on Capital Project Delivery Plan

Challenges
• Only projected to complete 70 percent of FY 18 budget
• Procurement of outside acquisition firm for easement acquisition took over five months
• Unanticipated costs on two emergency projects
Lessons Learned

• Lesson 1: Staff the Program Properly from the Start Even If You Have to Bring on Outside Resources Temporarily.

• Lesson 2: Develop a PMIS & Document Mgmt Strategy Early.

• Lesson 3: Develop a Cadence of Communication and Make it a Priority.

• Lesson 4: Take the Time to Document Existing Processes BEFORE Trying to Make Improvements.

• Lesson 5: Utilize Depth of Technical Resources from External Resources to Address Complex Issues and/or Projects.

• Lesson 6: Communicate Land Acquisition Needs EARLY

• Lesson 7: Keep the Consulting Engineers “On the Hook” for Providing Status Data for Their Projects.