

NAVAJO NATION/STATE OF UTAH WATER RIGHTS SETTLEMENT PROJECTS

WHITE PAPER

Prepared by Navajo Nation Department of Water Resources

June 6, 2014



***Navajo Nation/State of Utah Water Rights Settlement:
Water Development Projects White Paper
June 6, 2014***

INTRODUCTION

Since 2003, the Navajo Nation and the State of Utah have been engaged in negotiations to quantify the reserved water rights of the Nation in the State Utah. These negotiations resulted in a draft Navajo Nation/State of Utah Settlement Agreement and draft federal legislation prepared in early 2010 (Settlement Documents or Settlement). Subsequently the draft Settlement Documents have been shared with tribal, state and federal officials. In January of 2013 the Secretary of the Interior appointed a Federal Negotiation Team (Federal Team).

The objective of the *Navajo Nation/State of Utah Water Rights Settlement: Water Development Projects White Paper* (White Paper) is to concisely describe the scope and estimated costs of the water infrastructure and development projects (Projects, or singularly Project) contemplated in the proposed Settlement. In September of 2013, at the request of the Federal Team, the U.S. Bureau of Reclamation (Reclamation) Design, Estimating and Construction Advisory Team (DECAT) undertook a review of the Project. See *Reclamation, Design, Estimating and Construction Advisory Team Review Report: Navajo Nation/State of Utah Water Rights Settlement Projects Colorado Region, Utah* (September 2013) (DECAT Report). The Navajo Nation provided comments on the findings and recommendations made in the DECAT Report. The Navajo Nation Department of Water Resources (NNDWR) is currently soliciting bids for a Cost Firming Exercise to help refine the Project design and to address technical issues identified in the DECAT Report.

Design of water projects for this Settlement is complicated by the fact that while there is a clear boundary delineating the State of Utah, the Navajo Nation extends into three states and developing water systems to serve Navajo communities based on state boundaries is not necessarily logical or efficient. Accordingly, planning, whether performed by the Nation, the State of Utah, or an agency of the United States, has often considered alternatives with infrastructure in more than one state. While the Project proposed and described in the Settlement Documents is intended to serve demands only within the State of Utah, ongoing developments on the ground and progress in resolving the Nation's water rights in Arizona may require the parties to revisit Project design as the Settlement moves forward.

Technical materials relied upon to develop the Project were generated by Reclamation, the engineering firm of Brown and Caldwell (B&C), the Indian Health Service (IHS), and NNDWR. These materials were developed to meet a wide array of programmatic needs and addressed different study areas. For example, Reclamation under its Rural Water Authority has

investigated water needs between Halchita, Utah and Kayenta, Arizona. B&C developed chapter water plans for the nine Utah Chapters¹, but included the portions of the chapters that are within Arizona in their study area.

NNDWR incorporated elements from these diverse sources into the Settlement Documents in a manner consistent with the Navajo Nation's water supply needs and goals. *See NNDWR, Draft Water Resource Development Strategy for the Navajo Nation V12.1* (May 2012). Consequently, the methodologies utilized among the Project components are not always the same. Different assumptions are appropriate for different planning purposes and planning horizons. For instance, IHS is authorized to meet the domestic water supply needs of unserved homes. IHS uses a design criterion of 200 gallons per day *per home*. In contrast, the U.S. Department of Agriculture (USDA) Rural Development program uses 100 gallons per capita per day (gpcd) as a guideline to meet rural water system demands for a 20-year planning horizon. Regional municipal projects that are addressing long-term needs will have different criteria. The Navajo Nation utilizes 160 gpcd as its criteria for planning purposes, including the design of water settlement projects. *Id.* at 2, 53.

The Settlement would resolve the Navajo Nation's reserved water claims in the State of Utah, and for purposes of this White Paper the Study Area includes those parts of the Nation within Utah. However, some Project facilities located outside of Utah are proposed as alternative Project components.

The Project contemplated as part of the Settlement consists of four major components: 1) Utah Navajo Regional Water System, consisting of two major delivery systems (the San Juan River-Monument Valley Unit and the Eastern Utah Navajo Unit); 2) Capital Improvement Plan (CIP) to address public water system upgrades; 3) Remote Community Water Project to address projects on the IHS Sanitation Deficiency System list; and 4) Agricultural Water Conservation Program to improve approximately 2,400 acres of historically irrigated Navajo farmland.

The Project is intended to address short-term and long-term water development needs in the Study Area in a balanced and integrated fashion. It is also intended to create the opportunity to leverage a variety of programmatic funds. Some of the Project components emphasize core systems that are primarily addressing long-term future municipal water needs, while other

¹ The Aneth Chapter is the only Navajo Chapter located entirely within Utah. The Teec Nos Pos, Red Mesa, Mexican Water, Dennehotto, Kayenta, Oljato, Shonto and Navajo Mountain Chapters straddle the border between Utah and Arizona.

components are intended to serve short-term domestic water needs and address immediate sanitation deficiencies.

The costs used in the Settlement Documents were based on draft reports and have been revised in this White Paper and indexed to account for inflation. Since the Settlement Documents were drafted, Reclamation has continued its appraisal level analysis of the San Juan River-Monument Valley Unit, B&C slightly revised some of the alignments of the Eastern Utah Navajo Unit, and IHS has been addressing existing sanitation deficiencies in the Study Area. There have been changes to the project configurations as draft reports were reviewed and refined. These changes are a normal part of the iterative planning process. Water planning and development is a dynamic process, and the Settlement Documents captured a snapshot of that process, which will require revision as the settlement moves forward. The Nation's decision-making is converging on project configurations that will be cost effective, and best serve the short-term and long-term needs of the Navajo Nation.

I. UTAH NAVAJO REGIONAL WATER SYSTEM

A. San Juan River- Monument Valley Unit

The San Juan River-Monument Valley Unit is based in part on work funded and performed by Reclamation. Reclamation produced a series of draft reports of the *San Juan - Mexican Hat to Kayenta Regional Water Supply Appraisal Level Study* (versions 2008, July 2009, January 2013, December 2013, and February 2014). Reclamation also completed the draft *Mexican Hat Water Treatment Plant Appraisal Level Design* dated October 2009. These draft reports were subject to review and comment by the Navajo Nation. Each revision was an effort to address comments from the Navajo Nation and comments internal to Reclamation. None of these appraisal draft reports were finalized by Reclamation.

Appraisal level cost estimates are used to compare alternatives, and through a series of studies, Reclamation compared more than seven different scenarios. Some configurations of the proposed Reclamation project included extending the water supply line beyond Utah to Kayenta, Arizona. For some of the scenarios Reclamation assumed that 100 percent of the total Kayenta water demand would be served with San Juan River water; for some scenarios Reclamation assumed 50 percent of that demand; and for other scenarios Reclamation assumed that none of the Kayenta water demand would be met with San Juan River water. Scenario 7 reflects an all-Utah project, and the San Juan River-Monument Valley Unit proposed in the Settlement is based on this Scenario. Additional consideration included locating the regional water treatment plant at Halchita versus Kayenta, and adjusting the Navajo Nation per capita demand and growth rate. Consideration of many alternatives allowed Reclamation to

evaluate both the economy of scale of combining the Arizona and Utah water demands into a single project and the potential cost allocation between Arizona and Utah demands.

The San Juan River-Monument Valley Unit described in the Settlement Documents, which were finalized in March of 2010, was premised on information included in the draft B&C *Phase II Navajo Utah Regional Chapter Planning Reports* (Phase II Report), which in turn incorporated information from the 2008 Reclamation report (2008 Reclamation Report). The 2008 Reclamation Report estimated the cost for the all-Utah Scenario 7 to be \$61 million in 2008 dollars (or \$71.9 in 2014 dollars). For each scenario considered, one option was to treat the water at Halchita and distribute it in route, and another option was to convey raw water to a regional treatment plant, and run a return line back to Halchita. In every case, this second option had a higher appraisal level capital cost. For Scenario 7 the estimated cost of this approach was \$71 million in 2008 dollars (or \$83.6 in 2014 dollars). NNDWR adopted the less expensive approach with the treatment plant to be located at Halchita for purposes of the Project. However the advantages and disadvantages of both approaches need further evaluation.

The 2008 Report relied on a water demand of 160 gpcd. The 2008 Report used a projected 2.4% growth rate (projecting a 2060 study area population of 38,775 of which about 28% was in Utah) and a 2060 total study area water demand of 6,952 acre-feet (or 1,738 acre-feet for the Utah population).² Scenario 7 includes steel storage tanks capable of providing 6 million gallons of storage with a field cost of \$1.7 million in 2008 dollars.

Groundwater would continue to be used conjunctively with San Juan River surface water to most effectively utilize the available supplies. In the short-term, groundwater supplies would continue to be used during implementation of the Project. In the long-term, groundwater would provide redundancy during emergency and maintenance situations, as well as help to meet extreme summer peak demands during periods of drought. NNDWR will investigate the water chemistry to determine if utilizing conjunctive ground creates significant problems as part of the Cost Firming Exercise described above.

² In contrast to the San Juan River-Monument Valley Unit included in the Settlement Documents, Reclamation's February 2014 report pursues a project that would serve 100 percent of Kayenta, Arizona's water demands. The February 2014 report was based on a water demand of 160 gpcd but reduced the growth rate to 1.3 percent, resulting in a projected study area population of 12,572 by the year 2060 (only 15% of which is attributable to Utah). At full build-out the project would use approximately 2,255 acre-feet of water and 10.5 million gallons of storage annually.

The Project would include a direct intake structure on the bank of the river across from Mexican Hat. The intake would provide initial sediment removal. From the diversion, raw water would be treated at the river and conveyed through a 16-inch diameter ductile iron pipe approximately 40 miles to three proposed filter/chlorination sites. The Project would convey water from the San Juan River at Halchita near Mexican Hat, south along IR6440, then southwest along IR6480, and finally south along US163 to junction of IR42, which is also the junction to Oljato Chapter and Monument Valley Park, and retain the possibility of a future extension to Kayenta. Treated water would subsequently be distributed to the various communities through existing and future pipeline systems.

While Reclamation planning has narrowed to a project that would serve Navajo water supply needs in both Utah and Arizona, the Nation's focus remains fixed on a Utah-only project for settlement purposes, preserving the possibility of expanding service to include Arizona communities. For this reason, later iterations of the Reclamation *San Juan - Mexican Hat to Kayenta Regional Water Supply Appraisal Level Study* are of limited value in reviewing this Unit of the Project. A map of the proposed unit is attached as Figure 1.

B. Eastern Utah Navajo Unit

The Eastern Utah Navajo Unit is based on work funded largely by the Navajo Nation and the State of Utah, as it is described in the B&C Phase II Report. The Phase II Report described four water-planning alternatives. These alternatives were intended to bound the water development approaches for this area. The Eastern Utah Navajo Unit includes parts of Alternatives 1, 2 and 4, which are briefly described below. A map of the proposed unit is attached as Figure 2.

B&C Alternative 1 would supply several Utah chapters (including portions of those Chapters located in Arizona) primarily through a new water treatment plant on the San Juan River near Montezuma Creek and distribution systems from the water treatment plant to Red Mesa and to Aneth.

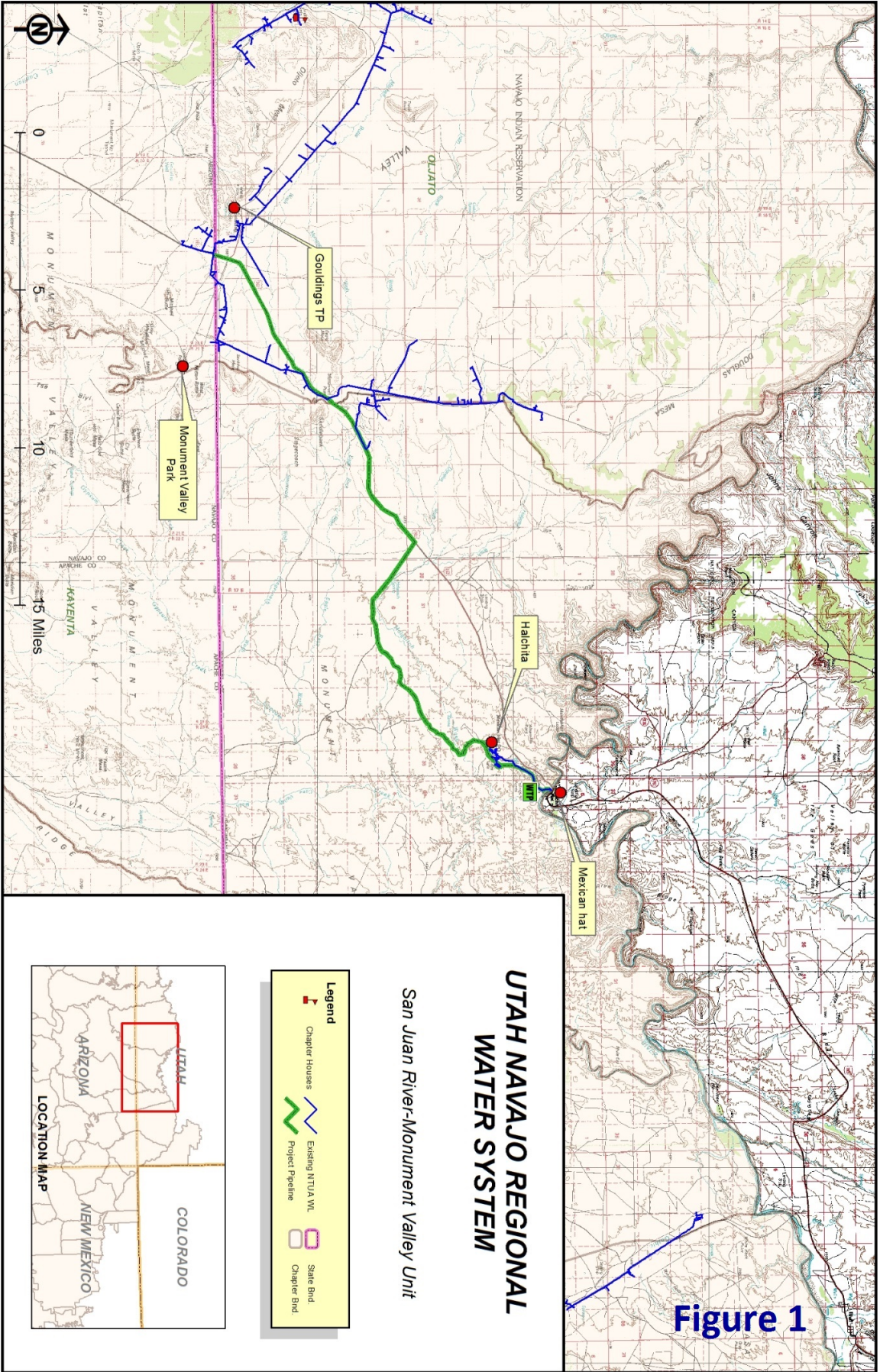







Figure 1

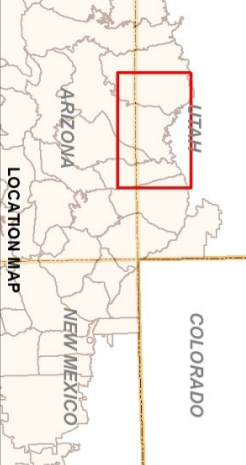
UTAH NAVAJO REGIONAL WATER SYSTEM

San Juan River-Monument Valley Unit

Legend

-  Chapter Houses
-  Existing NTJVA WL
-  Project Pipeline
-  State Blvd
-  Chapter Blvd

LOCATION MAP



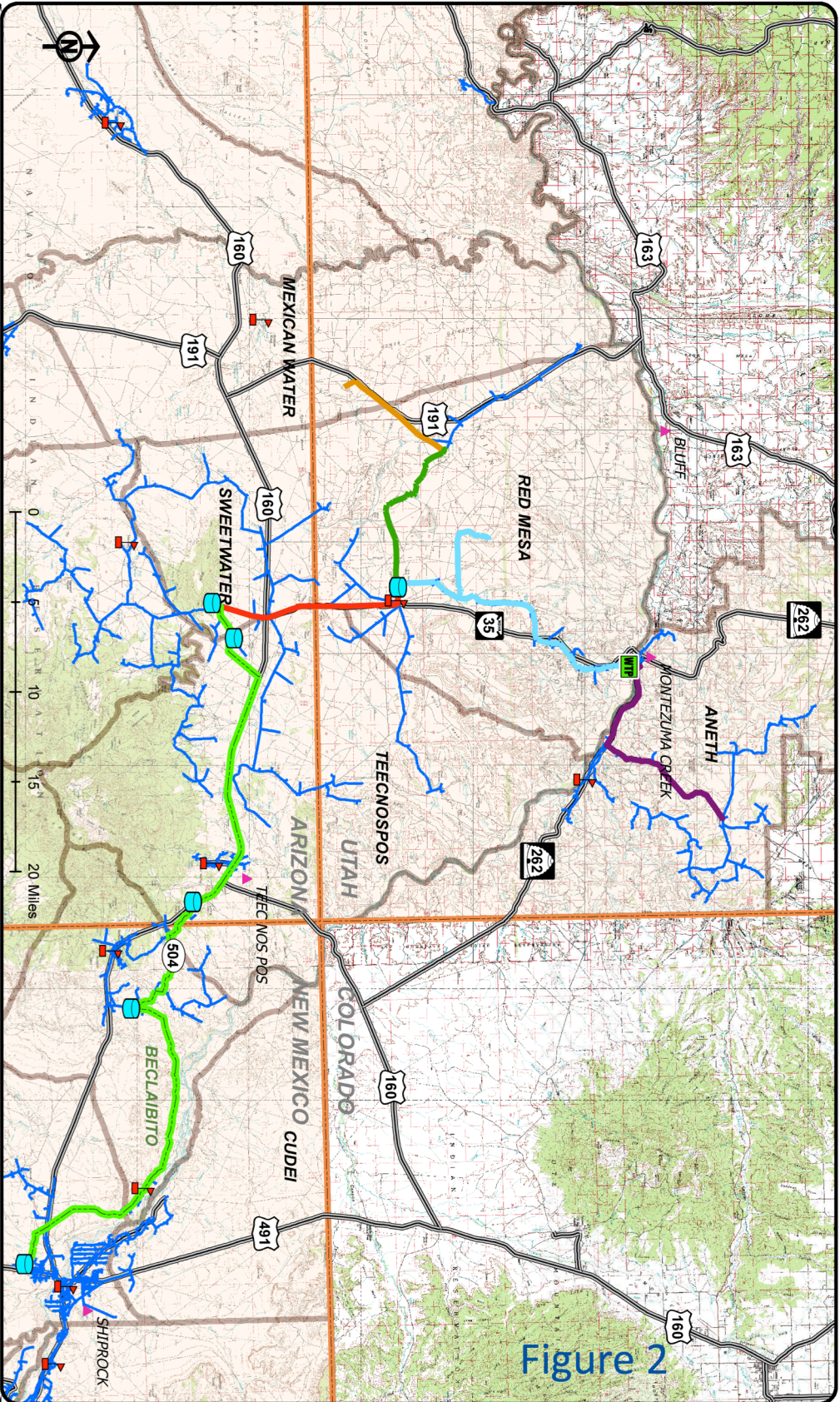


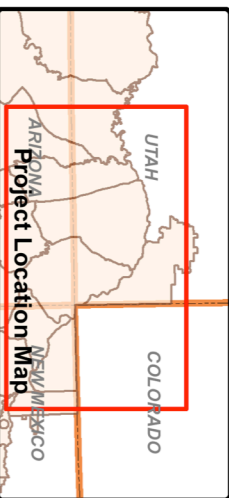
Figure 2

UTAH REGIONAL WATER SYSTEM

Figure 2

San Juan River Eastern Utah Navajo Unit

Map by: rtk, February 20, 2015



The approach for B&C Alternative 2 is to supply portions of the Teec Nos Pos, Sweetwater, Red Mesa and Mexican Water Chapters through a 14-inch diameter water supply line from the Shiprock Area (Sweetwater Transmission Line). This alternative would require some additional connections between Sweetwater, Red Mesa and Mexican Water. IHS has recently completed construction of a 14-inch water line from Teec Nos Pos to Sweetwater, and interties between existing Navajo Tribal Utility Authority (NTUA) systems allowing delivery of San Juan River water to Navajo communities in these Chapters in both Arizona and Utah. See IHS Projects No. NA-06-Q10, NA-06-Y03 and No. NA-13-R75, Sweetwater Transmission Line, Phases 1-4, and map attached as Figure 3.

B&C Alternative 3 would supply Utah Chapters with local groundwater wells. Local groundwater wells reduce the lengths of the transmission waterlines. However, poor groundwater quality requires additional expensive treatment and low yields make this alternative less feasible. It was not further investigated.

B&C Alternative 4 is a hybrid combining some of the project elements of Alternatives 1 and 2.³ It includes a smaller water treatment at Montezuma Creek to serve Red Mesa and Aneth Chapters, and treated water from the Sweetwater Transmission water line to serve Teec Nos Pos and Sweetwater Chapters. Alternative 4 requires the construction of a water treatment plant and of conveyance facilities from the Shiprock area. As noted above, IHS has recently completed construction of conveyance facilities from Teec Nos Pos to Sweetwater. The enlargement of the conveyance facilities from Shiprock is proposed but has not been funded. [See IHS Project No. NA-13-R75, Phases 5-7.]

The Eastern Utah Navajo Unit as currently envisioned consists of multiple components. Components 1-3, described below, are essential to delivering water to the existing community water systems and would need to be constructed regardless of the preferred source of water supply selected. Components 4-6, also described below, are three alternative water supply delivery options under consideration that may be used singly or in combination. Components 7 and 8 are different versions of the Sweetwater Transmission Line, which is on the IHS Remote Community Sanitation Deficiency System (SDS) list, but remains unfunded.

Selecting the preferred alternatives will require the input of the IHS, which designs and constructs most of the public water systems on the Navajo Nation, and NTUA, which operates

³ Note that “projects” designated in the various B&C alternatives may overlap and the numbers describing the same components may be different.

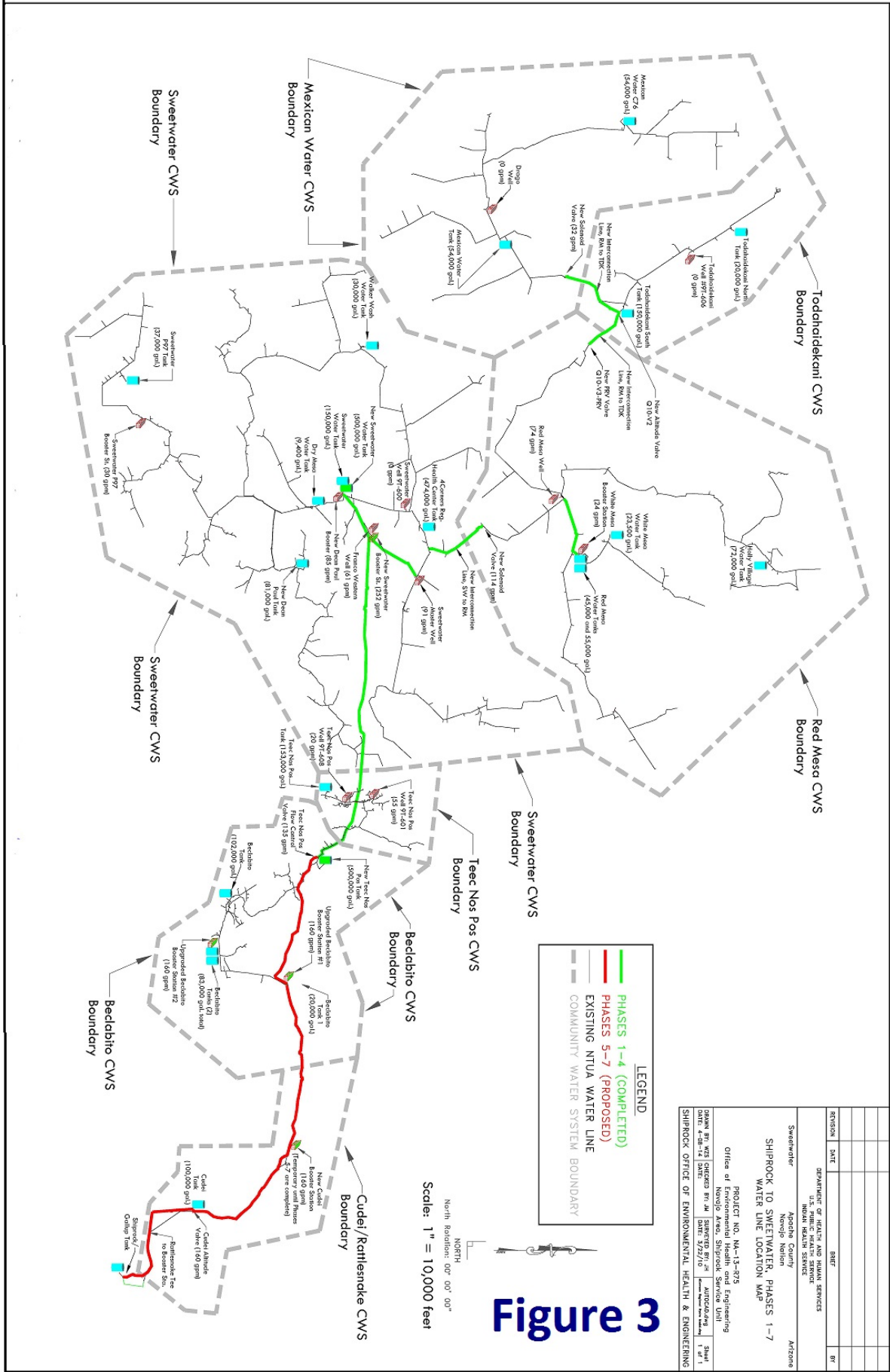


Figure 3

most of the public water systems. Both NTUA and IHS have expressed concern with the operation of a water treatment plant near Montezuma Creek, and prefer other options. NTUA has experience operating the water treatment plant at Halchita for decades, and until 2002 NTUA operated a water treatment plant at Shiprock. Both NTUA and IHS have expressed a preference for treating and conveying better quality water from the Shiprock area.

Although the Nation identifies a preferred source of supply for the Project in this White Paper, the Nation anticipates that the Cost Firming Exercise will provide additional information critical to choosing the proper Alternative Components and the source of supply.

**Component 1 - Red Mesa System to Todahaidekani/Mexican Water Supply Tank
(B&C Alternative 2, Project 6)**

Component 1 would be a water supply tank and related infrastructure to store water for the Todahaidekani/Mexican Water system. It includes approximately 5,389 feet of 10-inch diameter pipe and a 13,200-gallon storage tank. Water supply to this tank could come from either the Sweetwater Transmission Line (via Alternative Component 4, below) or from the Water Treatment Plant at Montezuma Creek (Alternative Component 5, below). This Component is described in the B&C Phase II Report; *Table 8.2: Regional Supply CIP Cost Estimate, Alternative 2-Shiprock to Sweetwater*; Project No. 6, Page 8.2. COST: \$654,000 in 2010 dollars (\$726,000 in 2014\$).

**Component 2 - Todahaidekani and Mexican Water Regional System
(B&C Alternative 2, Projects 7 and 8)**

Component 2 would convey water from the Water Supply Tank built as Component 1 to Todahaidekani and Mexican Water. It includes more than 50,000 feet of 8-inch pipe to convey water to the Todahaidekani delivery point, and then more than 30,000 feet of 6-inch pipe to convey water to the Mexican Water Delivery Point. IHS has already made connections between these existing NTUA systems. Additional investigation needed to determine if these connections are adequate to supply the projected water demands will be included in the Cost Firming Exercise. These Components are described in the B&C Phase II Report; *Table 8.2: Regional Supply CIP Cost Estimate, Alternative 2 – Shiprock to Sweetwater*; Project No. 7: \$6,434,000, and Project No. 8, \$3,008,000, Page 8.2. TOTAL COST: \$9,442,000 in 2010 dollars (\$10,480,000 in 2014\$).

**Component 3. Montezuma Creek/Aneth Regional System
(B&C Alternative 4, Projects 7, 8, and 9)**

Component 3 would connect the Montezuma Creek Supply Tank to the Montezuma Creek System and to the Aneth System. This Component is needed to convey water from either the Sweetwater Transmission Line (via Alternative Component 4, below) or from the proposed water treatment plant near Montezuma Creek (alternative Component 5, below). Component 3 includes several projects described in B&C Alternative 4: Project No. 7: Montezuma Creek to Aneth Supply Tank #1; Project No. 8: Aneth Supply Tank #1 to Aneth Supply Tank #2; Project No. 9: Aneth Supply Tank #2 to Aneth System. It includes 48,000 feet of 10- or 8-inch diameter pipe. Costs for this Component are included in the B&C Phase II Report; *Table 8.4: Regional Supply CIP Cost Estimate, Alternative 4-Hybrid*, Project No. 7: \$3,702,000, Project No. 8: \$4,548,000, Project No. 9: \$3,206,000, Page 8.3. TOTAL COST: \$11,456,000 in 2010 dollars (\$12,716,000 in 2014\$).

**Component 4 - Sweetwater Supply Tank to Red Mesa System Waterline
(B&C Alternative 2, Project 5)**

Alternative Component 4 offers one option for providing a water supply to the Red Mesa System. Component 4 would connect the Sweetwater Supply Tank to the Red Mesa System through a 14-inch waterline. The Indian Health Service has already made connections from the Shiprock area and between the Red Mesa and Sweetwater NTUA systems. Additional investigation needed to determine if the existing connection is adequate to supply the projected water demands will be included as part of the Cost Firming Exercise. This Component is described in the B&C Phase II Report; *Table 8.2: Regional Supply CIP Cost Estimate, Alternative 2- Shiprock to Sweetwater*; Project No. 5, Page 8.2. COST: \$7,865,000 in 2010 dollars (\$8,730,000 in 2014\$).

**Component 5 - Montezuma Creek Water Treatment Plant
(B&C Alternative 4, Project 1)**

Alternative Component 5 calls for the construction of a new regional water treatment plant and supply tank near Montezuma Creek. As described in B&C Alternative 4, Project No. 1: Water Treatment to Supply Tank#1, the water treatment plant would have adequate capacity to supply 3.25 million gallons per day to Aneth and Red Mesa. This Component is described in the B&C Phase II Report; *Table 8.2: Regional Supply CIP Cost Estimate, Alternative 4 – Hybrid*; Project No. 1, Page 8.3. COST: \$23,193,000 in 2010 dollars (\$26,543,000 in 2014\$).

Component 6 - Red Mesa to Montezuma Creek conveyance waterline (B&C Alternative 4, Projects 2, 3 and 10)

Alternative Component 6 is a 12-inch diameter supply line between Red Mesa and Montezuma Creek. This supply line would be necessary if the water treatment plant described in Component 5 were used as a source of supply for the Red Mesa, Todahaidekani and Mexican Water systems (Components 1 and 2) or if water delivered through the Sweetwater Transmission Line were delivered to the Montezuma Creek and Aneth systems (Component 3). Supply lines and interties recently constructed by IHS are delivering water along the route of this proposed supply line from a Red Mesa Supply Tank near Red Mesa Chapter House north to the Holly Village Water Tank, just short of Montezuma Creek. The Red Mesa/Montezuma Creek transmission line would also include a 6-inch diameter spur to the Casa del Eco public water system. Component 6 is described in the B&C Phase II Report; *Table 8.2: Regional Supply CIP Cost Estimate, Alternative 4 – Hybrid of Alternative 1 and 2*; Project No. 2: \$9,177,000, Project No. 3: \$2,406,000, and Project No. 10: \$3,902,000, all in 2010 dollars, Page 8.3. TOTAL COST: \$15,485,000 in 2010 dollars (\$17,188,000 in 2014\$).

Component 7 – Sweetwater Transmission Line

Due to concerns with arsenic in the community water systems of Red Mesa, Mexican Water and Todahaidekani, in Utah as well as Sweetwater, Arizona, IHS with the support of NTUA initiated an ambitious plan that has the potential to affect which alternatives and components will ultimately become the preferred alternative. *See IHS Feasibility Study: Community Water Supply Facilities: Shiprock to Sweetwater Regional Water System Transmission Line* (April 2, 2014), attached as Exhibit A. As previously described, the Sweetwater Transmission Line would bring water from Shiprock, New Mexico to Sweetwater, Arizona (*see discussion at pp. 5-6, supra*). IHS constructed the western part of the Sweetwater Transmission Line by installing a 14-inch diameter, 18-mile long waterline between Teec Nos Pos, Arizona and Sweetwater, Arizona. IHS also constructed a portion of the eastern end of the Sweetwater Transmission Line by installing 6 miles of 16-inch waterline between the Shiprock/Gallup storage tank and the storage tank in Cudej, New Mexico. *Id.* at 2. IHS also interconnected the Red Mesa, Mexican Water and Todahaidekani public water systems with 6-inch diameter waterlines. *Id.* (Phases 1 through 4). In 2014, these facilities had the capacity to convey 140 gallons per minute (gpm) from Sweetwater to the Utah Chapters. *Id.* at 3.

The proposed further expansion of the IHS Sweetwater Transmission Line to replace the 6-inch line between Cudej, New Mexico and Teec Nos Pos, Arizona with 16-, 14- and 12-inch water lines (Phases 5 through 7) will cost \$10,000,000 in 2014 dollars. If completed as currently

planned, the Sweetwater Transmission Line would be able to convey 1,000 gpm to Navajo community water systems in Utah.

At the time of drafting this White Paper, IHS is utilizing funding remaining from the Phase 4 construction budget to begin construction of the first reach of the 16-inch transmission line between the Cudei Tank and the Cudei Community (Phase 5A). This funding will only allow construction of the 16-inch line a short ways past the Cudei tank. At that point, the 16-inch line will be tied back into the old 6-inch line until further funding is available. The proposed transmission line alignment has all required archaeological and environmental clearances, and the design and the construction drawings are complete. However, funding has not yet been identified to complete construction of the remainder of the Sweetwater Transmission Line at this time.

Component 8 - Sweetwater Transmission Line Upsizing

IHS hydraulic modeling indicates that the capacity of the Sweetwater Transmission Line could be increased to 2,000 gpm by adding three, high flow, booster stations with associated buildings and 3-phase power extensions, one booster station upgrade and 3 storage tanks. The additional cost would be \$2,600,000.

The Sweetwater Transmission Line as currently designed by IHS is intended to convey 1,000 gpm, and the 14-inch diameter waterline installed during Phase 4 of the IHS project was constructed to convey 1,000 gpm. However, if funding were available to add an additional booster station to IHS Phase 5a during its initial construction, it would result in lower pressure in the pipeline. With this upgrade, the pipe in that reach could handle future flows in excess of 2,000 gpm. Funding would need to be identified prior to construction to modify the current design and to pay for the additional capital cost.

To deliver 2,000 gpm from Shiprock to the Sweetwater Tank, new boosters and tanks would be required between the Shiprock/Gallup Tanks and the Beclabito #1 Tank, between the Beclabito #1 Tank and the Teec Nos Pos Transmission Tank, and between the Teec Nos Pos Transmission tank and the Sweetwater Booster Station. In addition, a larger booster pump would be required at the existing Sweetwater Booster Station. IHS has estimated that these improvements needed to increase the capacity to 2,000 gpm would increase the cost of the Sweetwater Transmission by \$2.6 million.

Navajo Nation Preferred Alternative. With the benefit of the DECAT Report and updated information from NTUA, IHS and Reclamation, NNDWR has determined that for planning

purposes it is in the Nation's best interest to pursue the design of the Eastern Navajo Utah Unit that uses water delivered via the Sweetwater Transmission Line to serve all the Utah communities. Accordingly, the Project will encompass Components 1-3, and Alternative Components 4 and 6. Costs for completing, and potentially for upsizing the Sweetwater Transmission Line, are included for consideration, but are not included as part of the Project costs in this White Paper.

II. CAPITAL IMPROVEMENT PLAN

The Capital Improvement Plan (CIP) is based on work funded largely by the Navajo Nation and the State of Utah as described in the B&C *Hydraulic Engineering Analysis and Capital Improvement Plan Phase I* (B&C Phase I Report) (May 2010). The 10 projects included in the short-term plan had an estimated cost of \$14.1 million in 2009 dollars (or \$15.7 in 2014 dollars). Short-term projects are assumed to meet demands anticipated in the next 5 to 10 years. The 40 projects in the long-term plan had an estimated cost of \$67.7 million in 2009 dollars (or \$75.4 in 2014 dollars). The Navajo Nation included only the short-term projects because the long-term projects were considered too expensive and more speculative. The short-term projects are needed immediately.

III. REMOTE COMMUNITY WATER PROJECT

The funding included in the Settlement for IHS SDS water projects is based on the 2006 IHS SDS list developed pursuant to P.L. 94-437, which includes 30 SDS projects in the study area with a total eligible cost of \$12.6 million. Many of these SDS projects did not rank high enough for feasibility level study by IHS. Consequently, NNDWR added 25 percent to the project cost for design and engineering. The resulting total was \$15.7 million (2006\$). The 2014 SDS list includes 29 water projects with a total cost of \$23.8 million. Increasing this 2014 value by 25 percent for design and engineering would result in a total cost of \$29.75 million in 2014 dollars.

IV. AGRICULTURAL WATER CONSERVATION PROGRAM

The Agricultural Water Conservation Program is intended to improve approximately 2,400 acres of historically irrigated Navajo farmland. Some of this land is along Montezuma Creek, a tributary to the San Juan River, where upstream non-Navajo farmers divert water to the detriment of the downstream Navajo farmers. Pursuant to subsection 4.2.2 of the proposed Settlement Agreement, the Navajo Nation agrees to subordinate its priority for any new uses of water developed on the tributaries of the San Juan River in Utah. In order to reduce water shortages, this Settlement includes a \$5 million agricultural water conservation and

management program. Problems to be addressed include wind and water erosion, noxious weeds, pest control, soil texture and nutrient issues. Practices to be implemented include sprinklers and drip irrigation systems, land leveling, construction of pipelines and pumping stations, stream bank stabilization, pasture seeding and management, and construction of fencing and wind breaks.

The intention is to use these funds to help leverage additional monies through programs such as the USDA Environmental Quality Improvement Program (EQIP).

V. WATER DEVELOPMENT/OM&R TRUST FUND

Long term operation and maintenance expenses of the infrastructure projects will largely be the responsibility of the water users. However, the Navajo population has a very limited ability to pay. The Trust Fund established as part of the Settlement will cover a portion of the costs for operation, maintenance and repair during the early years of the Project while the service population is relatively small. In addition, the Trust Fund will form the basis of the replacement reserve and emergency fund in the event these Projects faces major repairs or emergencies in the future.

The methodology for determining the amount of the \$11 million OM&R fund (in 2014 dollars) was based on the methodology developed by Dowl HKM and presented in the *Northeastern Arizona Indian water Supply Alternatives, Appendix I* (March 25, 2009). The fund includes costs associated with anticipated replacement of key facilities as well as an unused capacity fund to address the period during which the project would have more capacity than can be served with the greatest economy.

CONCLUSION

Costs for all proposed Project components are described in Table 1. The total capital cost for the Navajo Nation preferred alternative is **\$172.1** million in 2014 dollars. With the inclusion of the Water Development/OM&R Trust Fund, the total cost of the Settlement is **\$183.2** million, excluding the costs associated with completion and upsizing of the Sweetwater Transmission Line. NNDWR is currently soliciting RFPs to complete the Cost Firming Exercise mentioned above. Completion of that work will further guide the Nation's decision-making and help further refine the design of the Project and the cost estimates.

Table 1. Water Resources Project Costs

Water Project Description	2010 Cost (\$ Millions)	2014 Cost (\$ Million)
1. Utah Navajo Regional Water Project	\$105.9	\$121.7
A. San Juan River - Monument Valley Unit (scenario 7)	\$61.0	\$71.9
B. Eastern Utah Navajo Unit	\$44.9	\$49.8
1. Red Mesa Todahaidekani and Mexican Water Supply Tank	\$.6	\$.7
2. Todahaidekani & Mexican Water Regional System	\$9.4	\$10.5
3. Montezuma Creek/ Aneth Regional System	\$11.5	\$12.7
4. Sweetwater Supply Tank to Red Mesa System	\$7.9	\$8.7
5. Montezuma Creek WTP and Tank	[\$23.9]	[\$26.5]
6. Red Mesa to Montezuma Creek transmission line (including Case del Eco spur)	\$15.5	\$17.2
7. IHS SDS Phases 5 to 7 (1,000 gpm)		[\$10.0]
8. IHS Upsized Phases 5 to 7 (2,000 gpm)		[\$2.6]
2. Capital Improvement Plan - Short Term Projects	\$14.1	\$15.7
3. Remote Community (IHS SDS) Projects	\$15.7	\$29.7
4. Agricultural Water Conservation Program	\$5.0	\$5.0
Total Capital Cost	\$140.7	\$172.1
Water Development/OM&R Trust Fund	\$10.0	\$11.1
Total Settlement Cost	\$150.7	\$183.2