## Table of Contents

**SECTION 1 - INTRODUCTION** ................................................................. 1-3

**SECTION 2 - REVITALIZATION PLAN** .................................................... 1-17

**SECTION 3 - MAINSTREET BUILDING GUIDELINES** ................................. 1-2

**SECTION 4 - UTILITIES EVALUATION** .................................................. 1-12

**SECTION 5 - PAVEMENT AND CONCRETE ANALYSIS** ............................... 1-4

**SECTION 6 - SCHEDULING AND PROJECT PHASING** ................................. 1-2

**Figures:**

1-1 VICINITY MAP
1-2 STUDY AREA
2-1 DOWNTOWN STREETSCAPE, OPTION NO. 1
2-2 DOWNTOWN STREETSCAPE, OPTION NO. 2
2-3 DOWNTOWN STREETSCAPE, OPTION NO. 3
2-4 DOWNTOWN STREETSCAPE, OPTION NO. 5
2-5 DOWNTOWN STREETSCAPE, MASTER PLAN
2-6 DOWNTOWN STREETSCAPE, DETAIL PLAN
2-7 DOWNTOWN STREETSCAPE, POSSIBLE PLANTER STYLES
2-8 DOWNTOWN STREETSCAPE, POSSIBLE PEDESTRIAN LIGHT STYLES
2-9 DOWNTOWN STREETSCAPE, ELEVATION
3-1 COMMERCE BOCk BUILDING STUDY
4-1 UTILITY ANALYSIS
5-1 PAVEMENT AND CONCRETE ANALYSIS
Section 1: Introduction

This section of the report provides an introduction to the Glenrock Downtown Revitalization Project Planning Report, describes the purpose and objectives of the report, and provides a brief overview of the format of the report.

Project Background

The Town of Glenrock is located in Converse County, Wyoming, approximately 20 miles east of Casper (See Figure 1-1). The population of the Town is approximately 2150.

Once called Deer Creek Station, Glenrock began as a mail and stage station on the Oregon Trail, and served as a vital supply station for immigrants traveling westward. More than 350,000 pioneers passed through the valley where Glenrock is located and stopped at the "rock in the glen" east of Town, giving the Town its present name. The discovery of gas and oil in 1912 contributed to the area's economy. Early coal mines and lead mining activity in the Laramie Mountains were also important to the area's economic history.

Oil refining provided jobs through the 1950's. Also in the 50's, the planning and construction of the Dave Johnston Power Plant was completed, concurrent with the development of Glenrock Coal Company. The 1960's saw the completion of Interstate Highway 25 which replaced US 20/26 as the main highway between Casper and Glenrock. The main north-south roadway connecting I-25 with the Town is now 4th Street, which intersects with US 20/26 in the central Downtown area.

Glenrock, like many other smaller Wyoming communities, has experienced several boom and bust cycles. Several Downtown buildings have endured since Glenrock's heyday when it was known as Deer Creek Station. The Downtown area still reflects some of the history and tradition of the old west. The Town and its citizens have a heritage steeped with a reverence for the past pioneer days and closeness that a small tight-knit community can bring.

Wanting to preserve and enhance Glenrock's rich heritage, in 1999 the Town applied for, and received a Community Development Block Grant (CDBG) from the Wyoming Business Council to prepare a "conceptual plan" for the Central Business District in the Downtown area of Glenrock.
Town of Glenrock

Vicinity Map

Figure 1-1
Section 1  Introduction

The Downtown business district area is a six block area consisting of two blocks on both the east and the west side of 4th Street on US Highway 20/26, and one block on both the north and south side of US Highway 20/26 on 4th Street (See Figure 1-2). The intersection of US Highway 20/26 and 4th Street is the main intersection in the Town, serving as the stopping point for the two main routes for traffic into and out of Glenrock.

Purpose

The purpose of the Glenrock Downtown Revitalization Planning Report is to provide the Town with a conceptual plan for revitalizing the Downtown area. The conceptual plan includes a master plan for revitalizing the Downtown area that provides plans for developing streetscaping and landscaping themes that will make the Downtown area an attractive destination for the traveling public. The conceptual plan also includes provisions for upgrading underground utilities, streets and storm drainage, improving and accenting buildings and historic structures.

Planning Objectives

The key to a successful revitalization concept for the Downtown area is a careful balance of diverse land uses, and design elements that accentuate the role of the pedestrian. Some of the important planning objectives of his revitalization plan are:

- Develop landscaping and streetscaping options and improvements that will:
  - Build on Downtown's historic heritage by implementing streetscape materials and elements that have a historic character, unique to the architecture of Glenrock.
  - Make the Downtown area a destination to be used by the entire community of Glenrock and people passing through Glenrock.
  - Maintain or increase parking in Downtown.
  - Make Downtown more pedestrian friendly (safe, appealing, and convenient to access). Look at pathways and linking the existing pathway to the Downtown area and even possibly to the nearby North Platte River.
  - Make Downtown a community destination by providing year round color, interest, and activities.
Section 1 Introduction

- Landscape parking lots so they do not detract from the street quality of Downtown.
- Enhance the Downtown identity. Identify where Downtown begins, ends and where major attractions are located.
- Encourage and provide more green space Downtown, both public and private.
- Establish links to the Interstate 25, US Highway 20/26, and Wyoming 95 that provide attractive gateways to the Downtown area.

- Evaluate the building construction and design on the Downtown area to develop options and improvements to accent their historic and attractive value.

- Complete a thorough evaluation of the municipally owned utilities in the Downtown area to determine the improvements needed to service the planned uses.

- Complete a thorough evaluation of the roadways, sidewalks and gutters to determine the available options and improvements necessary to meet the traffic and pedestrian needs of the Downtown area.

Report Format

The subsequent sections of this report address the following:

Section 2 Downtown Revitalization Master Plan
Section 3 Mainstreet Building Guidelines
Section 4 Utilities Evaluation
Section 5 Pavement and Concrete Analysis
Section 6 Scheduling and Project Phasing
Section 2

Revitalization Plan

This section of the report presents the background for developing the Revitalization Master Plan, the options reviewed during the study and the preferred Revitalization Master Plan.

Analysis and Findings

From our initial meeting with the revitalization committee, a number of ideas and elements were identified by the Town as being important or not wanted by the community. The following list identifies those elements.

Community Wants and Needs

In an effort to get the ideas out, the residents were asked questions that helped direct the study. One question was "What's Great about Glenrock?" Responses included the following:

- Glenrock is a friendly community with a good quality of life.
- Glenrock has clean air and clean water.
- No traffic lights! And we don't want any!
- A very walkable community.
- Glenrock has a low crime rate.
- Glenrock is a social and involved community.
- Downtown has some great historic architecture.
- Glenrock has a great school system
- Strong small businesses.
- Deer Creek Days!

Another question asked of the residents was "What are the needs of the community and Downtown?"

- Need more inviting gateways from I-25.
- Need more green space in the Downtown area.
- Need more places to sit and talk with neighbors and friends.
- Need better signage to the park, clinic, post office, Chamber of Commerce and City Hall.
- Need a better walk along the Highway connecting Deer Creek and the park to Downtown.
Section 2

Revitalization Plan

- Existing historic architecture needs to be upgraded and protected.
- Need an attraction to bring in visitors.
- Paleontology Museum.
- Possible Downtown Improvements
  - Flowers
  - Benches
  - Trees
  - Lighting
  - Parking lot screening
  - Green areas
  - Public Restroom
  - Drinking Fountain
  - Clock
  - Information Kiosk
  - Public Art or Interpretation signage
- Need lodging facilities.
- Sponsor a Glenrock clean-up day or other community events.

A final question was “What Other Items Need to be Addressed?” Responses included the following:

- Birch Street is too wide and should be reduced in width.
- Possible themes for the Downtown improvements:
  - Historic
  - Paleontology
- Want to make a visit to Glenrock a good experience
- Possible displays at vacant storefront windows.
- Christmas displays
- Possible source of brick at the old refinery.

Design Elements

During the course of the project, a number of elements were discussed that could or should be added to Downtown to make it a more vibrant pedestrian destination. The elements that were discussed fall into one of four categories; Character and Identity, Pedestrian Amenities, Vehicular Amenities, and Spaces and Activities.
Section 2

Revitalization Plan

Character and Identity

The character and identity of Downtown can be enriched using many historic themes unique to Glenrock. These themes help give Downtown a lasting impression to its residents and visitors and range from dinosaurs, historic trails, cowboys and the wild west, and the oil boom.

- Signage

Several different types of signs could be implemented into the Downtown to direct visitors to key locations and to add to developing a historic character. A wayfinding sign program should be studied to entice and direct visitors Downtown, particularly from I-25, both northbound and southbound. This signage system would start at strategic locations along the highway with a hierarchy of features that are easy to follow to the heart of Downtown.

Gateway signage features could occur at the cemetery from the north and near the interchange of I-25 to the south. The south location would need additional signage to draw travelers into Town because of the long distance between the highway and the Town limits.

- Public Art

These visual amenities add interest at the pedestrian scale. Both larger and smaller pieces should be sought and placed in key open spaces where there is enough room to view them. Wind art is a potential addition to the Downtown. This type of art would certainly provide non-stop motion in the Glenrock climate. Some of the possible art pieces could be:

- Sculptures (Stone/Bronze etc.)
- Wind Sculpture
- Sidewalk Art
- Building Art
- Banner Art

- Historic Plaques
- Paleo. Art
- Water Features
- Planter Pots
- Information Kiosks

If public art is intended for the Town, a comprehensive art plan should be made to identify locations and types of art that the community would like. Public art is best when it can be integrated into the community as part of public or private improvements when they occur. With this program in place, the Town can go after specific pieces or be ready to place a traveling piece when the opportunity arises.
Section 2

Revitalization Plan

- **Banners**
  The discussion of banners is one that has many points of view, particularly in Glenrock. Cloth or canvas banners have been tried in the past in the area (Casper) and have almost always been destroyed by the wind. Other types of banners could be made of metal or wood which could provide the color and excitement of cloth banners and have a longer life span. If this type of banner is desired, poles need to be designed to accept a more durable, heavier banner. This type of banner may also be incorporated into street or pedestrian light poles, or the gateway features.

**Pedestrian Amenities**
As with all the character amenities, they need to be balanced with the pedestrian spaces and have similar character to signage elements. The pedestrian amenities listed below should be strategically distributed throughout Downtown in a manner that creates a hierarchy of distinct yet visually integrated pedestrian zones. The specific needs of the users, the businesses and the available area will dictate this pattern.

- **Site Furnishings**
  The implementation of site furnishings is an important key to making streets pedestrian friendly and vibrant. The elements listed below need to be designed and chosen to match the desired historic character and are durable in the harsh Glenrock winter climate. There are many companies that have a line of site furnishings that would meet the character and durability needs of Downtown.

  > Benches, Trash Receptacles and Ash Urns
  These site furnishings should be made of a durable material like metal with a baked on powder coated finish. Wood benches may also be used, but they will require a higher amount of maintenance over time. Benches should have a back so that they are comfortable to sit in and are less likely to be abused by skate boarders. Trash receptacles should have a wind proof lid and an internal metal can that can be replaced if necessary. Ash urns should also have a wind proof lid. The placement of these
elements should be reviewed with adjacent business owners to assure that they will be used and do not create conflicts.

- Tree Grates/Tree Vaults
  There is a strong desire to add street trees to the Downtown streetscape. The street environment is not necessarily a good place to encourage tree growth. Tree grates are important to allow for free oxygen exchange and water to the root mass of the tree. These grates can be metal, precast concrete, stone or a combination. The tree grate surface should be easy to walk on and should have a maximum slot opening of $\frac{1}{4}$" to allow for ADA accessibility. The opening for the tree should be adjustable over time to allow the tree trunk to grow.

Tree vaults are an investment in the street that can have a big impact on whether the street trees live or die. A tree vault is a large underground vault that gives the trees roots room to grow in the concrete environment of the street/sidewalk. The vault should have a minimum of at least 120 CF of area and is made of structural concrete that can support the walk and grate above. Each vault needs a subsurface drainage system to keep the tree from drowning in case of heavy rain or an irrigation malfunction and devices such as perforated pipe should be used to allow oxygen to reach the roots. The backfill mix should be free draining and have adequate organic material to allow for good root growth. Tree vaults are expensive (sometimes more than 10X the cost of the tree) but are worth the investment if healthy street trees are a priority.

- Bicycle Racks
  Bicycle racks should be added to the Downtown amenity vocabulary and biking to Downtown should be encouraged. The area requirement for bicycle racks depends on how many racks are being placed. They should be located near public open areas where space allows. Individual racks can be added near businesses that see bicyclists as an active customer. The racks should be simple and have a clean form that matches the historic character of the other furnishings.
Section 2

Revitalization Plan

- Special Railings and Bollards
  It may be necessary to place decorative railings or bollards. These elements can be used to protect pedestrians at intersections, driveways to businesses and parking, mark areas for outdoor cafes or to notify pedestrians of some other hazard such as a steep drop-off or tall curb. These elements should be metal to match the character of the other site furnishings and be painted a complementary color.

- Public Restrooms
  Public restrooms would be a benefit to the area, particularly during Deer Creek Days. These restrooms would need to be on public property and have constant maintenance.

- Plantings
  The addition of street trees and planter pots can help create a more pedestrian friendly environment. Street tree selection should be based on plant hardiness in this climate, the available area for it to grow both above and below the ground, the orientation of the street, and the business use adjacent to it. Generally, trees with a more upright form work better in a streetscape condition because the canopy will have fewer conflicts with the adjacent buildings and street uses. Selected trees should also be pruned up to allow for pedestrians to walk under them. Tree size should be 2 1/2" to 3" caliper at installation.

  To select the right trees, soil samples should be taken to determine the types of soils, identify any contaminants that would be harmful and to determine the types of amendments that need to be added. A search of locally grown and available plants needs to be made. One of the best ways to determine what type of tree will grow is to study the trees that have been planted in the area and their planting methods. If possible, the use of “xeriscape” or low water usage plants should be made a priority. Street trees will be the exception to that, due to the type of materials that are desired along the street.

  Planter pots have a number of issues that need to be solved before they are used. First of all, they need to be maintained on a regular basis. This includes plant replacements, cleaning of the mulch and checking that the moisture content in the soil is adequate. Secondly, materials for winter interest need to be found such as evergreens or ornamental
Section 2

Revitalization Plan

Grasses. Planter pots used along the street need to be in character with the overall streetscape and be durable. They need to have adequate size to grow the desired plant and need to be free draining.

- Irrigation
Whatever planting improvements are made Downtown, the installation of an automatic irrigation system is a must! An automatic irrigation system helps keep a constant, measurable amount of water to the plants and saves both time and money in the long term. As more and more plants get installed, Downtown cannot rely on the City Parks Department to hand water trees, shrubs and planter pots.

The system should be designed so that it is easy to use and is made of high quality parts and controllers. The system should be designed with the assistance of the Town and whoever will maintain it.

Along with the irrigation system, hose bibs should be included at regular intervals along the street so special plantings can be watered and sidewalk pavements can be washed down when needed.

- Lighting
No other street improvement can make as much of an immediate difference in the feel of a street as street and pedestrian lighting. Lighting adds a needed vertical element to the street and should have a historic character. Unlike trees, lighting has a strong presence all year long. There are three major types of lighting that will be needed for Downtown.

  - Street Lighting
Street lighting is the lighting which makes the street safe to drive. This lighting is currently in the Downtown area, and could be supplemented with additional poles if necessary. The type of pole and fixture could be changed to allow for a character that matches other improvements. At a minimum, the existing poles should be painted to match the color of other vertical street elements. The standards for the spacing and
Pedestrian Lighting

Pedestrian light fixtures are typically lower in scale than street lights and provide a vertical element that is more in scale with the pedestrian. Reviewing old photos of Glenrock show that there have been many different pedestrian lights in Downtown over time, but currently, none exist.

The character of the pedestrian lights should have a historic feel and should be able to have elements such as signs and metal banners attached to them. The wattage of the bulb should be relatively low so that it doesn't overpower the eye and become an uncomfortable hot spot. Light spacing should be between 60' and 80' and work in a regular pattern with the street trees and street lights.

Electrical Outlets

All weather electrical outlets should be included within the Downtown streetscape. These outlets could be at every street/pedestrian light or at every street tree to allow for holiday lighting. These outlets can also serve as power for vendor carts and small group performances. If the outlets are placed at street trees, the installation method will need to be monitored carefully so that installation doesn't interfere with the root ball.

Paving Materials for Pedestrian Surfaces

The sidewalks in Downtown Glenrock are dominated with standard gray concrete. The main need is to help get some color into the pedestrian pavement surfaces to help break the monotony of gray concrete. The walk surface color and texture variations will provide year round color to add interest to the sidewalks.

There are a number of ways that color can be added to the sidewalk surfaces. The materials that were discussed are listed below.
Concrete

Although the use of standard gray concrete is too much at the present time, it is an economical choice for large areas that need to be paved. Scoring patterns can add another level of interest to gray concrete, along with custom finishes such as sandblasting or acid etching.

Concrete can also be specified in a number of colors using an integral color concrete mix. This mix colors the entire depth of concrete, so chipping and fading is less of a problem. There are also a number of products on the market called shake-ons that add color to the top layers of the concrete slab after it has been poured. They are more economical than integral color but can chip and fade over time, leaving gray concrete visible. Another method of coloring and texturing concrete pavement involves stamping a pattern on the concrete after it has been poured. These patterns range from stone to brick and can be effective in adding texture to the walk surface. Combined with integral or shake-on color, they could be used to make walk surfaces more attractive.

Interlocking Unit Pavers

Interlocking unit pavers are an excellent way to add color to the walk surface. These pavers come in an infinite number of colors because they can be made using custom colors to match the needs of the city. They come in many different shapes and patterns and can be set on compacted road base and sand or on a concrete base and sand. Interlocking concrete unit pavers are more expensive than colored concrete and cost competitive with clay brick pavers.

Clay Brick Pavers

Clay brick pavers can be used anywhere interlocking concrete pavers are used. Clay brick pavers are manufactured in rectangular shapes and earth tone colors.

As with any paver, concrete or clay, the durability of the specific paver depends on how it was manufactured. Not all pavers will be acceptable in the Glenrock climate, and careful selection and installation criteria should be in place before selecting a paver. Similar to
plant materials, it is important to see what type of materials have done well in the local area to aid in the selection of new materials.

- **Stone Paving**
  
  There are also a number of stone paving types that can work well in the Downtown area. They include granite and sandstone, each with their own compliment of colors. These materials are generally much more expensive than concrete and pavers, but add a real sense of quality to a project. Although Glenrock may not be able to use a lot of these materials, they could be used as an accent paving surface in key locations. There are some local Wyoming quarries that produce a sandstone paving material. These should be researched to determine if the product will work for Glenrock.

**Vehicular Amenities**

Over time, the streets in Downtown Glenrock have been designed to handle vehicular traffic with little importance placed on the pedestrian. The streets are currently too wide for the amount of traffic that they handle. To better balance the pedestrian and vehicular needs, it would be beneficial to narrow some streets so that the walks can be widened to allow for more pedestrian amenities.

- **Parking**
  
  While parking is not a major issue with the Town at this time, the desire to maintain as much parking as possible is still a goal for this project. The basic concept for parking in Glenrock is to provide parallel parking on Birch Street and to allow for diagonal parking on the north/south side streets. Parallel parking is generally more efficient in streets with a lot of drives because there is an amount of unused parking area at the beginning and end of a row of diagonal parking. Parallel parking is also more friendly to the pedestrian because the front of the car isn't invading the walk zone.

- **Intersection Neck Downs**
  
  Intersection neck downs are a method to slow traffic at the intersection and to shorten the distance that the pedestrian has to walk to cross the street. Neck downs add more space to the pedestrian zone to allow for more options when placing street furniture and plantings.
Generally, on-street parking is not affected by intersection neck downs because of the set back distance for parking from the intersection. Pedestrian neck downs are proposed for the intersection along Birch at 2nd, 3rd, 4th, 5th and 6th. Intersection neck downs could also occur at the alley intersections along Birch.

- Pedestrian Cross Walk Improvements
  Improvements to the crosswalks can help slow traffic and add a level of comfort for the pedestrian. These improvements can be anything from a nicely scored concrete to the use of brick, stone or colored co.
  Improvements to the crosswalks can help slow traffic and add a level of comfort for the pedestrian. These improvements can be anything from concrete. Whatever the material, it should be designed to handle heavy traffic loads and the constant assault by snow plows during the winter months.

- Narrowed Streets
  Narrowing a wide street can be very effective in slowing down traffic, and making it more pedestrian friendly. Narrowing can increase the width of the sidewalk zone, allowing for street trees and other street furniture and activities. Narrowing of the street needs to be balanced with the current and anticipated traffic volumes.

Spaces and Activities
- Spaces
  The need for more public spaces in the Downtown area was also a desire by the committee. Additional open space creates areas for public art, small gatherings and additional green space. Three spaces were identified as possible additions to an open space program for Downtown.

- Parking lot just east of the Paisley Shaw. This could be an important space for Downtown because of it's prominent location on Birch. The space could provide a small seating area, a location for public art or displays, or an activity area for planned events. The Town would need to talk with the owner of this site to see if the parking could be located elsewhere in Downtown.
The vacant lot just north of the Four Aces on the east side of 4th Street is another possible location for additional open space. It is close to the main intersection of 4th and Birch and could also be used for a variety of activities.

The parcel just north of the Town Hall on the west side of 3rd Street could also be a possible open space. Although this lot is not on Birch Street, it is visible from the intersection of Birch and 3rd, and would be a good amenity to both Birch Street and the Town Hall.

Activities
Along with the Downtown improvements, additional activities need to be developed to keep people coming back to Downtown. Some of the activities discussed include farmers market, parades, arts and craft fairs, sidewalks sales, public art exhibits, special events and seasonal festivals. The development of activities that can include the entire family is an important key to getting more people Downtown.

Streetscape Options
There are a number of streetscape options for the Downtown area that relate directly to the final width of the streets. The current walk widths in Downtown are generally narrow without any amenities. As discussed by the group, the elimination of travel lanes was a goal for the project if possible. Fewer lanes would allow for wider walks and pedestrian areas. There were five possible street width options that were presented to the Town. These options only apply to Birch Street and 4th Street, south of Birch because they are part of the State highway system. The other Downtown streets are discussed later in this report.

Option 1
The first option studied is shown in Figure 2-1 and includes reducing the number of lanes in Birch Street from five to three. This cross section would be two 12' travel lanes, one 12' continuous turn lane and two 8' parking lanes. This would allow for a 24' wide walk on each side of the street within the 100' right of way. While this option was what the group initially wanted, there was some concern that the walks would be too wide, increasing the cost to the Town for construction, and a potential maintenance problem for cleaning and snow removal.
Option 2
The second option is illustrated in Figure 2-2 and would be to build a five lane cross section with three 11’ lanes, two 10’ lanes, and two 7’ parking lanes. This would allow for a 16.5’ walk at each side of the street. Although this section would be possible, the narrower travel lanes and parking lanes could be a problem for approval by WYDOT.

Option 3
The third option is illustrated in Figure 2-3 and is similar to option two except that the continuous 11’ center lane would be a landscaped median along Birch, with left turn pockets at the 4th Street intersection. This option would allow the Town to keep a median in Birch Street that would have adequate width for an attractive green area in the street. This option is the preferred option for the Master Plan.

Option 4
The fourth option is similar to option 3 with a landscaped median, only not provide the left turn pockets at each intersection. This would allow for a more continuous median, but would increase the inconvenience for motorists wanting to turn left onto 4th Street.

Option 5
The last option is illustrated in Figure 2-5 and would provide four 12’ travel lanes (no left turn lanes) and two 8’ parking lanes. This option would allow for two 18’ wide sidewalks.

Other Downtown streets
The north/south streets that intersect Birch (3rd, north block of 4th, 5th and 6th) would remain two lane streets with diagonal parking. Diagonal parking will allow the Town to have a larger parking reservoir on streets with less traffic volume. Where possible and if costs allow, these streets should have full pedestrian amenities including trees in grates, pedestrian lights, new walk surfaces and furnishings.

Preferred Option
The Master Plan is presented in Figure 2-5. The Plan illustrates a character for the Downtown area of Glenrock that draws from its rich history and desire for the community to have places to sit and talk with flowers and trees, and an improved pedestrian environment.
Town of Glenrock

Downtown Streetscape
Option No. 3

Figure 2-3
Town of Glenrock  Downtown Streetscape  Master Plan

Figure 2-5
Plan Elements:

- Intersection Neck Downs
  Intersection neck downs are shown at all intersections along Birch Street. These neck downs would narrow the street at the intersections by 8' at each side. This provides a shorter crossing distance for pedestrians and additional pedestrian space along the sidewalk for signage, banner poles, information kiosks or public art.

- Cross Walks
  New crosswalks are shown at the intersections of Birch and 3rd, 4th and 5th Streets. These new cross walks are proposed to be colored concrete paving, with a complementary color to the brick paving at the new sidewalks. A more detailed view of the Birch and 4th Street intersection is shown in Figure 2-6. New handicap accessible ramps will also be placed at all four corners of the intersections.

- Parking
  On street parking will be provided on all streets in Town. Parallel parking is provided on Birch Street, and diagonal (60 degree) parking is provided on the north/south cross streets except for the south portion of 4th Street.

  Parking lot screening is shown at the City Hall parking lot, and at the Deer Creek Drug parking lot. This screening would be a low hedge or wall, with shade trees in wider areas.

- New Walk Pavements
  The plan shows new concrete walks along Birch Street and a brick amenity zone near the curb. The concrete walks are approximately 12'-6" wide and are scored to match the texture and scale of the street. The concrete should have a slight color additive or have a sandblast finish to soften the tone of standard gray concrete. The brick amenity zone is 4' wide. The materials for this zone could be clay brick or concrete unit pavers that match an architectural style in the Town.

  Also included in the walk zone is a 10' square panel that could be either native stone or colored concrete. This panel is set at 45 degrees to the street and can be used as an
Section 2 Revitalization Plan

accent panel or a historic interpretive plaque. These panels are spaced evenly between each tree.

- Street Trees and Grate/Median Plantings
The proposed street trees for Birch Street should be generally upright in form with a maximum spread of approximately 30'. This will allow a large enough tree to shade the walk, while not fully blocking businesses and their signage. The spacing for the trees is 35' O.C., which allows for eight trees per face block. Each tree is placed in a 4' x 12' metal tree grate that allows for adequate growing room for the tree roots. Possible tree varieties include Ash, Honeylocust or Hackberry.

Within the median of Birch Street, smaller ornamental trees have been placed to reduce the scale of the street. These trees should be small enough to fit within the regulations of WYDOT, and should have either a good spring flower, or a good fall color. Flower beds or low groundcover beds along with sod could also be placed in the medians if the proper maintenance is provided.

All street trees will be irrigated with an automatic irrigation system. Plantings at the medians will also be irrigated. Planters could be irrigated, but would need to be in a permanent location. Possible planter styles are shown in Figure 2-7.

- Pedestrian Scale Lighting
Pedestrian lights will be spaced between every other tree. This will allow for a pedestrian light spacing of 70', which is adequate to light the pedestrian walks along the street. Wattage for these lights should be as low as possible so as not to create light "hot spots" at the walks and in front of businesses. The preferred wattage of these lights should be 28 watt compact flourescent. The pedestrian lights should provide a warm glow over the sidewalk environment. The light fixture type could be an acorn or globe style with a metal cap piece. The pole should be fairly simple, with some type of historic detailing or fluting. Examples of pedestrian light styles are shown in Figure 2-8.
Town of Glenrock

Downtown Streetscape
Possible Planter Styles

Figure 2-7
Town of Glenrock

Downtown Streetscape
Possible Pedestrian Light Styles

Figure 2-8
Section 2

Pedestrian Seating & Trash Receptacles

Pedestrian seating would be placed along the street flanking the 45 degree paving insets. This configuration would allow for small groups to sit and talk around these areas. The plan calls for four benches per block face. The benches should be at least 6' long, and have a durable wooden seating surface for comfort. Trash receptacles and ash urns that match the benches should be placed at each bench grouping. Trash receptacles should also be placed at each street intersection (2/intersection).

Banners

The master plan has the option of providing two different types of banners. The first type would be located at the main intersection of Birch and 4th Street as illustrated in Figure 2-9. A tall banner pole (20' tall) would be placed at each corner which would allow for banners to be stretched across each of these streets. The pole for these banners would be similar in design to the pedestrian light poles so that it would fit within the streetscape when banners are not in use.

The other type of banner would be mounted either from the streetlights or the pedestrian light poles. These banners would be made from cut metal and attached to the side of the poles. The banners would be brightly colored and could announce upcoming events, have seasonal message, or be a permanent type of banner that would reflect the historic or cultural history of the Town.

Public Art

The plan provides numerous opportunities for the addition of public art to the project. Small pieces of sculpture could be placed along the streetscape, similar to how Casper has provided bronze sculptures throughout Downtown. Art could also be included at the larger bulb out areas near intersections, or in the pavements along the streetscape. A public art program should be established for the Town with specific locations and priorities so that when the opportunity arises, a piece could be placed in the desired location. Other opportunities could include wall art, banner design, information kiosks, signage, store fronts, building attachments, etc.
Section 2

Estimated Costs

A breakdown of the quantities and costs for constructing the preferred Master Plans is not provided herein. For the purpose of this study, a typical cost of $490,000 per block is used. This cost is typical of other recent similar projects in Casper and other cities along the front range of the Rockies, and includes intersection neckdowns, sidewalks, pavers, landscaping, irrigation, pedestrian lighting, contingencies and design costs. The total estimated cost for the six block streetscaping study area is $2,940,000. As the project evolves, and the Town selects the level of the streetscaping desired, more accurate cost estimates can be developed.
This section of the report provides the general guidelines for Glenrock Mainstreet buildings. These guidelines should be considered for any building renovation in the Downtown study area; particularly for those historic buildings such as the Old Commerce Building. An example of how historic building can be revitalized is shown in the figure at the end of this section.

**Be true to the original character of the building**
- Analyze the building to determine what was original.
- Research the history of the buildings through photographs, newspaper articles, stories, etc.
- Respect the character of the building as it relates to the rest of the block.
- Glenrock's Downtown buildings are an expression of the traditional American storefront designs from the turn of the century. (This is the genuine heritage that should be maintained.)
- Use materials appropriate for Downtown design (glass, masonry, concrete, painted wood, painted metal, glazed tile).
- Use only roof forms similar to the rest of the block.

**Maintain the original size and shape of the building**
- Preserve the original mass (don't create anything untrue to the original) it should stick out and take away from the overall relationship to the block.
- Original color and materials should be considered on how they effect the other buildings.
- Original cornice lines also give an authenticity to overall building and neighborhood structures.

**Preserve building lines that break up the overall mass (horizontal and vertical)**
- Save the kickplate and bottom of the large glass display line. This creates a strong solid base for the large display areas.
- Maintain the large first story window openings or shopping display windows. These define the Downtown activity areas and make them more pedestrian.
- The transom space above the large display windows should also be saved. They can be a good source of light or can be converted into signage space with a solid type or soft awning material.
- Even the horizontal area created between the transom and second story windows help break down the mass to a more human scale.
Section 3  

Mainstreet Buildings

- The second story windows must be preserved. This is a main element too that ties the whole block together at the top.
- The original cornice shape should be maintained to add that little bit of character unique to that building.
- Try to keep entryways where they existed. This effects the overall entry pattern of the block. They also create vertical lines to emphasize the entry.

Retain the character down to the last detail

- Preserve tiled entryways (modify original name only if you need to).
- Maintain or abstract the “old hardware” look and feel (doorknobs and hinges).
- Don't cheap out materials, fixtures, or fittings, keep it authentic in look and feel.
- Replace or repair materials not holding up to weather (wood trim, tile, cornice moldings, coping, etc.).
- Consider using fabric awnings where appropriate. They protect the building and make it attractive to shopping (colorful and festive).
- Second story window treatment should coordinate with the first story (curtains, blinds, etc.).
- Original ornamentation on the building should be restored.
- Re-open windows if they are blocked.
- Maintain original ceilings and ceiling heights. (Abstract old materials if needed).
- Try not to paint original brick. If the brick is already painted, avoid removal processes that could cause damage (sand blasting, etc.). Consider stripping and repaint.
- Avoid reflective or opaque glazing (It's not authentic or pedestrian friendly).
- Keep as much glass in the doors as possible to maintain original character.
- Use plumbing fixtures to enhance the original character of the building. Use re-conditioned or re-manufactured fittings and fixtures that meet today's codes.
Commerce Block Building Study

Town of Glenrock

Figure 3-1
As part of the overall conceptual plan, a utilities evaluation was performed to ensure the utilities were capable of providing long term reliable service for the improvements proposed in the revitalization plan. This section of the report provides the results of the municipal utilities evaluation and presents recommended utility improvements that meet the study area needs for the next 20 to 30 years. The utilities evaluated include the water distribution system, the storm sewer collection system and the sanitary sewer collection system.

Evaluation of Existing Utilities
The existing water, sanitary and storm sewer systems were thoroughly inventoried for the study area, including a review of all of the Town's record drawings. Additionally, all of the manholes in the study area were surveyed and the lids were opened to identify materials of construction, condition, depth and configuration. The condition of the existing systems were thoroughly discussed with the Glenrock Public Utilities personnel to identify areas of concern and maintenance problems. The sanitary sewer and storm sewer systems were hydraulically modeled to determine their capacity and ability to convey existing and future flows. The results of the utilities evaluation for the water, storm sewer and sanitary sewer systems are summarized hereinafter.

Water System Inventory and Evaluation
There are approximately 5,000 feet of water distribution system pipelines in the Downtown area ranging in size from 4-inch to 8-inch diameter. All of the waterlines in the Downtown area are thought to be constructed of ductile iron pipe (DIP) or cast iron (CI) and are located under the streets (See Figure 4-1). It is believed that all of the original pipelines are still in service.

Evaluation of the water distribution system was made in part by reviewing WDEQ guidelines for design and construction of water systems. Some of the pertinent guidelines that were used for this evaluation include the following:

- The minimum size of a watermain providing fire protection and serving fire hydrants shall be in 6-inches diameter. Any mains smaller than 6-inches shall be justified by hydraulic analysis and future water use.
Town of Glenrock

Utility Analysis

Figure 4-1
Section 4 Utilities Evaluation

- Dead-end water mains shall be minimized by looping where dead-end mains occur, they shall be provided with a flushing hydrant or blowoff for flushing purposes.

- Fire hydrants shall be located at every intersection. In residential areas, fire hydrant spacing shall be no greater than 400 feet. In business or commercial areas, fire hydrant spacing shall be no greater than 300 feet and no building shall be greater than 150 feet from a hydrant. Valves on watermains shall be located at not more than 500-foot intervals in commercial districts and at not more than one block, or 800-foot intervals in other districts.

- Watermains, valves, fittings and appurtenances shall be designed and constructed of materials that withstand external corrosive forces from the soil, and internal corrosive forces from the water being conveyed.

A hydraulic model was not developed to evaluate the water distribution system capacity as part of this study. However, the system was recently modeled for a Level II Study performed for the Wyoming Water Development Commission (WWDC). All other information used to evaluate the water system in the Downtown area was provided by the Glenrock Public Utilities. The record drawings were reviewed with the Glenrock Public Utilities staff and recommendations were provided. Based on the above criteria and recommendations of the staff, the following evaluations were made:

- All of the watermains are old and constructed of cast-iron or ductile iron pipe. These metallic watermains exhibit external corrosion and experience periodic leaks requiring repair. These metallic watermains are not cathodically protected and are not protected with polyethylene wrap.

- The watermain on 3rd Street is a 4-inch line and is undersized. Hydrant leads from the 4-Inch watermain are also undersized.

- Fire hydrant spacing in the Downtown area appears to meet the above guidelines. However, the hydrants appear to have 4-inch barrels rather than the required 6-inch barrels.
Valve spacing appears to be adequate, however, additional isolation valves would greatly assist with repair work.

Recommended Improvements
The proposed water system improvements include replacement of all of the ductile iron pipe (DIP) water mains within the Downtown study area. Due to the corrosive character of the soils in the Downtown area, the DIP has experienced deterioration. The Glenrock Public Utilities staff has indicated there are portions of lines in the Downtown area that cannot be shut off as a direct result of inoperable valves. The staff has experienced increasing water line breaks caused by the external corrosion of the ductile iron lines. With the increasing potential for main breaks and the possibility of not being able to shut the main down, there exists the likelihood for a catastrophic event in the downtown area. In addition, many of the pipelines are undersized and do not meet DEQ sizing requirements. The undersizing of the hydrants and limited fire flows makes the water main situation a major concern and a high priority for the Town of Glenrock.

The proposed improvements are shown on Figure 4-1. The existing pipelines are blue in color. The proposed pipelines are shown with a light blue shade over the existing pipelines to be replaced. In general, the existing DIP mains will be replaced with new 8-inch PVC pipelines. The fire hydrants, hydrant lead pipe, and isolation valves shall also be replaced. All valving, metal fittings, and fire hydrant assemblies are recommended to have cathodic protection to prevent external corrosion in the future. All existing water services should be replaced with new taps, radio read metering, and service line piping from the new main to the curb stop. The new service line should be polyethylene or copper piping with some level of cathodic protection.

Estimated Costs
A breakdown of the water system improvements along with estimated quantities and unit costs are shown in Table 4-1. The total cost for the proposed improvements is estimated to be $577,265.
## Table 4-1

### Estimated Costs for Water System Improvements

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>UNIT COST</th>
<th>TOTAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Birch St. (2nd St. to 6th St.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F&amp;I 8&quot; PVC with Fittings</td>
<td>LF</td>
<td>2000</td>
<td>25.00</td>
<td>50,000.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; Gate Valve</td>
<td>EA</td>
<td>14</td>
<td>1,000.00</td>
<td>14,000.00</td>
</tr>
<tr>
<td>Connect To Existing Mains</td>
<td>EA</td>
<td>11</td>
<td>1,500.00</td>
<td>16,500.00</td>
</tr>
<tr>
<td>R&amp;R Existing Services</td>
<td>EA</td>
<td>15</td>
<td>1,100.00</td>
<td>16,500.00</td>
</tr>
<tr>
<td>F&amp;I Fire Hydrant Assembly</td>
<td>EA</td>
<td>4</td>
<td>3,000.00</td>
<td>12,000.00</td>
</tr>
<tr>
<td>F&amp;I 4&quot; Asphalitic Concrete Pavement &amp; 8&quot; Base Course for trench work</td>
<td>SY</td>
<td>3500</td>
<td>22.00</td>
<td>77,000.00</td>
</tr>
<tr>
<td><strong>Subtotal Birch Street</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$ 186,000.00</strong></td>
</tr>
<tr>
<td>4th St. (Aspen St. to Cedar St.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F&amp;I 8&quot; PVC with Fittings</td>
<td>LF</td>
<td>800</td>
<td>25.00</td>
<td>20,000.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; Gate Valve</td>
<td>EA</td>
<td>2</td>
<td>1,000.00</td>
<td>2,000.00</td>
</tr>
<tr>
<td>Connect To Existing Mains</td>
<td>EA</td>
<td>2</td>
<td>1,500.00</td>
<td>3,000.00</td>
</tr>
<tr>
<td>R&amp;R Existing Services</td>
<td>EA</td>
<td>14</td>
<td>1,100.00</td>
<td>15,400.00</td>
</tr>
<tr>
<td>F&amp;I Fire Hydrant Assembly</td>
<td>EA</td>
<td>2</td>
<td>3,000.00</td>
<td>6,000.00</td>
</tr>
<tr>
<td>F&amp;I 4&quot; Asphalitic Concrete Pavement &amp; 8&quot; Base Course for Trench Work</td>
<td>SY</td>
<td>650</td>
<td>22.00</td>
<td>14,300.00</td>
</tr>
<tr>
<td>F&amp;I 2 1/2&quot; Asphalitic Concrete Pavement &amp; 8&quot; Base Course for Trench Work on Local Street</td>
<td>SY</td>
<td>650</td>
<td>17.00</td>
<td>11,050.00</td>
</tr>
<tr>
<td><strong>Subtotal 4th Street</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$ 71,750.00</strong></td>
</tr>
<tr>
<td>3rd St. (Aspen St. to Cedar St.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F&amp;I 8&quot; PVC with Fittings</td>
<td>LF</td>
<td>800</td>
<td>25.00</td>
<td>20,000.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; Gate Valve</td>
<td>EA</td>
<td>2</td>
<td>1,000.00</td>
<td>2,000.00</td>
</tr>
<tr>
<td>Connect To Existing Mains</td>
<td>EA</td>
<td>1</td>
<td>1,500.00</td>
<td>1,500.00</td>
</tr>
<tr>
<td>R&amp;R Existing Services</td>
<td>EA</td>
<td>10</td>
<td>1,100.00</td>
<td>11,000.00</td>
</tr>
<tr>
<td>F&amp;I Fire Hydrant Assembly</td>
<td>EA</td>
<td>2</td>
<td>3,000.00</td>
<td>6,000.00</td>
</tr>
<tr>
<td>F&amp;I 2 1/2&quot; Asphalitic Concrete Pavement &amp; 8&quot; Base Course for Trench Work on Local Street</td>
<td>SY</td>
<td>1300</td>
<td>17.00</td>
<td>22,100.00</td>
</tr>
<tr>
<td><strong>Subtotal 3rd Street</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$ 62,600.00</strong></td>
</tr>
<tr>
<td>5th St. (Aspen St. to Deer St.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F&amp;I 8&quot; PVC with fittings</td>
<td>LF</td>
<td>1600</td>
<td>25.00</td>
<td>40,000.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; Gate Valve</td>
<td>EA</td>
<td>2</td>
<td>1,000.00</td>
<td>2,000.00</td>
</tr>
<tr>
<td>Connect To Existing Mains</td>
<td>EA</td>
<td>3</td>
<td>1,500.00</td>
<td>4,500.00</td>
</tr>
<tr>
<td>R&amp;R Existing Services</td>
<td>EA</td>
<td>8</td>
<td>1,100.00</td>
<td>8,800.00</td>
</tr>
<tr>
<td>F&amp;I Fire Hydrant Assembly</td>
<td>EA</td>
<td>2</td>
<td>3,000.00</td>
<td>6,000.00</td>
</tr>
<tr>
<td>F&amp;I 2 1/2&quot; Asphalitic Concrete Pavement &amp; 8&quot; Base Course for Trench Work on Local Street</td>
<td>SY</td>
<td>2600</td>
<td>17.00</td>
<td>44,200.00</td>
</tr>
<tr>
<td><strong>Subtotal 5th Street</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>$ 105,500.00</strong></td>
</tr>
<tr>
<td>6th Street (Both sides of Birch)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Page 4 of 12
Storm Sewer Collection System Analysis

The storm sewer collection system was thoroughly inventoried using existing drawings and a field inventory of all of the inlets and manholes. The system's ability to convey the 10-year storm water event was hydraulically modeled and analyzed.

Storm Sewer Inventory - There are approximately 3,000 feet of storm sewer collection pipelines in the Downtown area not including the piping which connects the inlets to the storm sewer main, see Figure 4-1. The storm sewer piping ranges in size from 15-inch to 33-inch diameter. The storm sewer pipe is constructed of reinforced concrete pipe (RCP).

The pipe sizes and configuration were obtained from the Glenrock Public Utilities record drawings. The Town plans to video inspect all of the storm sewers in the Downtown area; this information was not available at the time of this report. All manholes and storm sewer inlets were inventoried during field investigations. The manholes are all concrete. The inlets are either grate or curb-opening. Both types are highly susceptible to clogging.

There are two primary storm sewer collector lines in the study area as shown on Figure 4-1. Line "A" located in Birch Street (US Hwy 20/26) begins as a 15-inch collector and extends from the intersection of Ninth Street eastward to Sixth Street where it increases to a 27-inch pipeline and continues eastward to Second Street. From there, it extends northeastward two blocks where it outfalls into Deer Creek. Line "A" is constructed of reinforced concrete pipe (RCP). Most of the
inlets along the south side of Birch are curb-opening style. Most of the inlets along the north side are the grate type. These inlets collect overland flows from the south to Cedar Street.

Line "B" is located north of Line "A", and parallels Line "A" along Aspen Street. It starts as a 27-inch pipeline and extends eastward from Sixth Street to Second Street as a 30-inch pipeline. This pipeline also outfalls several blocks farther east into Deer Creek. The storm sewer inlets for Line "B" are manholes constructed in the pipeline with grated covers. The street is inverted and so there are no curb inlets. The Line "B" system collects overland flows from the south to Birch Street. It is also capable of handling any additional flows that pass by the Line "A" system.

Hydraulic Analysis - StormCAD software was utilized to perform the hydraulic modeling of the Downtown area storm sewer collection system. StormCAD uses the Rational Method for calculating overland flows based upon rainfall statistics, and Manning's equation with the standard step method for gradually varied flow to calculate the hydraulic conditions in the pipelines. StormCAD uses a link-node description of the system and hydraulically models the system over a period of time utilizing the mathematical solution for gradually-varied flow. Each reach of pipe is detailed as to size, length, end constraints, and roughness. The assumptions used to perform the hydraulic modeling for the storm sewer system are summarized in Table 4-2.

<table>
<thead>
<tr>
<th>Table 4-2</th>
<th>Storm Sewer Hydraulic Modeling Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manning’s “n” value for the existing storm sewer pipelines</td>
<td>0.020</td>
</tr>
<tr>
<td>Rainfall Intensity Data (Ref. NOAA Atlas 2, Precipitation Frequency Atlas of the Western United States Volume# - Wyoming)</td>
<td></td>
</tr>
<tr>
<td>Storm sewers designed to convey 10-year storm event.</td>
<td></td>
</tr>
<tr>
<td><strong>Residential Areas Outside Study Area:</strong></td>
<td></td>
</tr>
<tr>
<td>Storm sewers flowing into study area were assumed to be flowing full.</td>
<td></td>
</tr>
<tr>
<td><strong>Commercial Areas:</strong></td>
<td></td>
</tr>
<tr>
<td>Runoff Coefficient</td>
<td>0.70 to 0.95</td>
</tr>
<tr>
<td><strong>Light Industrial Areas and Residential Areas:</strong></td>
<td></td>
</tr>
<tr>
<td>Runoff Coefficient</td>
<td>0.50 to 0.70</td>
</tr>
</tbody>
</table>
The hydraulic model for the storm sewer was performed for two different scenarios:

- The existing system conveying the flows from a 10 year storm event.
- The proposed system conveying the flows from a 10 year storm event.

In general the Downtown area is fully developed. Some of the lots in the area could be further developed which may change the runoff coefficient slightly for an area; however, these changes will not significantly impact the sizing of the proposed storm sewer collection system. For these reasons a "fully developed" analysis of the basins was not performed. The recommended improvements for the storm sewer provided later in this section will convey the flows for the existing developed conditions and any future improvements which may be made in the study area. The results of the storm sewer hydraulic modeling are provided in Appendix A.

**Storm Sewer Collection System Improvements**

From the field inspections and hydraulic model, the storm sewer mains and laterals are adequately sized and are generally in good condition. The hydraulic model shows Line "A" is slightly undersized, however, the additional overland flows from Line "A" can be collected by Line "B", which has the capacity to handle the additional flows. In general, the proposed storm sewer improvements consist of replacing all of the inlets in the Downtown study area. The Glenrock Public Utilities staff has stated the existing inlets are highly susceptible to clogging and have caused problems in the past. The existing pipelines and inlets are magenta in color as shown on Figure 4-1. The proposed improvements are shown in red. The proposed improvements for both storm sewer mains are summarized below.

- **Line “A” in Birch Street** - Replace all inlets with a combination inlet that has a curb-opening and a grate. This type of inlet has greater capacity when clogging conditions exist. Remove and replace all manhole tops and lids to match proposed roadway grade.

- **Line “B” in Aspen Street** - Remove and replace existing 40-inch diameter grate inlets with manhole tops and lids to match proposed roadway grade. Install two combination inlets at each corner along the south side of Aspen Street. This recommendation consists of the
reconstruction of Aspen Street from an inverted crown street to a crowned street configuration.

This scenario will not be included in the final project costs but is summarized in Table 4-3.

**Estimated Costs**

All of the storm sewer improvements and costs for Line “A” in Birch Street will be done by WyDOT with their proposed construction project. The proposed storm sewer collection system improvements are shown in Figure 4-1. A breakdown of the improvements for Line “B” and the reconstruction of Aspen Street, along with estimated quantities and unit costs are shown in Table 4-3. The total cost for the improvements to Aspen Street is estimated to be $214,409.

**Table 4-3**

**Downtown Storm Sewer Cost Estimate**

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>UNIT COST</th>
<th>TOTAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>R&amp;R Existing 40&quot; Dia. Inlet W/Manhole Lid</td>
<td>EA</td>
<td>6</td>
<td>2,500.00</td>
<td>15,000.00</td>
</tr>
<tr>
<td>F&amp;I Catch Basin</td>
<td>EA</td>
<td>12</td>
<td>2,250.00</td>
<td>27,000.00</td>
</tr>
<tr>
<td>F&amp;I 15&quot; Laterals</td>
<td>LF</td>
<td>250</td>
<td>25.00</td>
<td>6,250.00</td>
</tr>
<tr>
<td>Remove street pavement</td>
<td>SY</td>
<td>2500</td>
<td>6.00</td>
<td>15,000.00</td>
</tr>
<tr>
<td>4&quot; Asphlt, 8&quot; base course</td>
<td>SY</td>
<td>2500</td>
<td>22.00</td>
<td>55,000.00</td>
</tr>
<tr>
<td>Remove and replace curb and gutter</td>
<td>LF</td>
<td>1760</td>
<td>18.00</td>
<td>31,580.00</td>
</tr>
<tr>
<td>Sidewalk</td>
<td>SY</td>
<td>600</td>
<td>25.00</td>
<td>15,000.00</td>
</tr>
</tbody>
</table>

**Subtotal** 164,930.00

10% Contingency $16,493.00

20% Engineering $32,986.00

**Total** $214,409.00

**Sanitary Sewer Collection System Analysis**

The inventory results and analysis results for the sanitary sewer collection system are provided below. The system was thoroughly inventoried using existing drawings and a field inventory of all of the manholes.

**Sanitary Sewer Inventory** - There are approximately 2,600 feet of sanitary sewer collection pipelines in the Downtown area as shown on Figure 4-1. Evaluation of the sanitary sewer system was made in part based upon review of WDEQ guidelines for design and construction of sanitary sewer collection system. Some of the pertinent WDEQ guidelines that were used for this evaluation are:
Utilities Evaluation

- Sewers shall be 8-inch diameter or larger except 6-inch sewers may be used in cul-de-sacs.

- Manholes shall be located at all changes in pipe size, vertical or horizontal alignment, pipe intersections, and the ends of lines. Maximum spacing is 400 feet.

- Design of the sewer system should be based upon peak flows for the area being served. The carrying capacity of the system may be based upon hydraulic modeling.

There are four main sewers running through the study area. The three northerly flowing sewers are located in alley between 6th and 5th Streets (6 and 8-inch), 5th and 4th Streets (6-inch) and 4th and 3rd Streets (6 and 8-inch). The three sewers connect into a 10-inch sewer main located in Aspen Street, which carries the wastewater eastward toward the treatment system.

The sanitary sewers range in size from 6-inch to 10-inch diameter. The majority of the sanitary sewers were constructed when the subdivisions were developed and are constructed of vitrified clay pipe (VCP). All manholes on the system are constructed of concrete. A detailed manhole inventory of the sanitary sewer system is provided in Appendix "B" to this report. The pipe sizes and configuration were obtained from the Glenrock Public Utilities record drawings. The Glenrock Public Utilities staff has reviewed the majority of the sewer lines in the Downtown area. Numerous areas have shown roots entering the vitrified clay piping (which is typical) and has caused ongoing clogging problems requiring frequent maintenance.

Hydraulic Analysis - XP-SWMM software was utilized to perform the hydraulic modeling of the Downtown area sanitary sewer collection system. The XP-SWMM software utilizes the EPA SWMM version 4.31 algorithms and adds graphical capabilities and user customizing features. Specifically, the Extended Transport model (EXTRAN) capabilities of the software were utilized. EXTRAN uses a link-node description of the system and hydraulically models the system over a period of time utilizing the mathematical solution for gradually-varied unsteady flow (St. Venant) equations. Each reach of pipe is detailed as to size, length, end constraints, and roughness. The assumptions used to perform the modeling for the sanitary sewer system are summarized in Table 4-4.
Section 4
Utilities Evaluation

Table 4.1 - Sanitary Sewer Evaluation Assumptions

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manning’s “n” value for the sewer pipelines</td>
<td>0.014</td>
</tr>
<tr>
<td>Peak flow factor for Downtown study area</td>
<td>5.0</td>
</tr>
<tr>
<td>Peak flow factor for residential areas flowing into study area</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Residential Areas:
- Average daily wastewater production per capita: 150 gallons
- Average number of residents per home: 2.5 people

Commercial Areas:
- Average daily wastewater production per lot: 1000 gallons

The sanitary sewer hydraulic model was performed for two scenarios:
- Fully developed average day flows
- Fully developed peak hour flows

The analyses assumed fully developed flows with all the buildings which are currently vacant as occupied. In general, the areas to the south and to the west of the study area served by the sanitary sewer analyzed are fully developed.

Sanitary Sewer Collection System Improvements
The recommended sanitary sewer improvements are shown on Figure 4-1. The existing pipelines are green in color and the proposed improvements are shown with a light green shade over the existing pipelines to be replaced. The majority of the sewer lines in the study area are constructed with vitrified clay piping. The Glenrock Public Utilities staff have experienced tree roots growing in the sanitary sewer pipeline at numerous locations within the Downtown study area. The vitrified clay sewer piping has deteriorated or structurally cracked over time, allowing tree roots to enter the pipeline and cause clogging problems. A portion of the pipelines within the Downtown area are 6-inch diameter and do not comply with Department of Environmental Quality (DEQ) standards. DEQ requires all sanitary sewer collection pipelines to be a minimum of 8-inch diameter. A description of the proposed improvements are described below:
• Line Between 5th and 6th Streets - Replace the existing 6-inch and 8-inch sewer lines to the south of Aspen Street with an 8-inch line from Aspen Street to Cedar Street. New manholes should be installed at the dead-end of the line at Cedar Street, at the intersection of the line from the cul-de-sac to the west, at Birch Street for a grade break, and at the connection in Aspen Street.

• Line Between 4th and 5th Streets - Replace the existing 6-inch line to the south with an 8-inch line all the way up to Deer St.. This line is undersized and has caused Glenrock Public Utilities maintenance problems. This line would connect to existing manhole and would receive flows from the newer subdivisions to the southwest, which have caused the line to be undersized. Replace the existing 6-inch line to the north with an 8-inch line and connect to the existing 10-inch line along Aspen St. Manholes should be installed at Aspen Street, Birch St., at Cedar St., and at Deer St..

• Line Between 3rd and 4th Streets - Replace the existing 6-inch line to the south with an 8-inch line and dead-end the line at Cedar St. Replace the existing 8-inch line to the north with an 8-inch line and connect to the existing 10-inch line along Aspen St. This section of line has given the Glenrock Public Utilities problems in the past.

In addition to the upsizing and reconfiguration recommendations, it is anticipated that all of the existing VCP sewers will ultimately need to be replaced due to structural cracking or failures, and the age and properties of the material.

**Estimated Costs**

The proposed sewer line improvements are shown in Figure 4-1. A breakdown of the sewer system improvements, along with estimated quantities and unit costs are shown in Table 4-5. The total cost is estimated to be $273,091.
### Table 4-5

#### Downtown Sanitary Sewer Cost Estimate

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>UNIT COST</th>
<th>TOTAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alley Between 3rd &amp; 4th (Aspen St. to Cedar St.)</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F&amp;I 48&quot; Dia. Manhole</td>
<td>EA</td>
<td>3</td>
<td>3,000.00</td>
<td>9,000.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; PVC Sewer Main</td>
<td>LF</td>
<td>670</td>
<td>40.00</td>
<td>26,800.00</td>
</tr>
<tr>
<td>R&amp;R 4&quot; Service Connections</td>
<td>EA</td>
<td>13</td>
<td>750.00</td>
<td>9,750.00</td>
</tr>
<tr>
<td>F&amp;I 4&quot; Asphalitic Concrete Pavement &amp; 8&quot; Base Course for trench work</td>
<td>SY</td>
<td>220</td>
<td>22.00</td>
<td>4,840.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; Base Course for Alley</td>
<td>SY</td>
<td>250</td>
<td>6.00</td>
<td>1,500.00</td>
</tr>
<tr>
<td>F&amp;I 4&quot; Asphalitic Concrete Pavement &amp; 6&quot; Base</td>
<td>SY</td>
<td>750</td>
<td>16.00</td>
<td>12,000.00</td>
</tr>
<tr>
<td><strong>Subtotal Between 3rd &amp; 4th</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>63,890.00</strong></td>
</tr>
<tr>
<td>Alley Between 4th &amp; 5th (Aspen St. to Deer St.)</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F&amp;I 48&quot; Dia. Manhole</td>
<td>EA</td>
<td>4</td>
<td>3000.00</td>
<td>12,000.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; PVC Sewer Main</td>
<td>LF</td>
<td>1100</td>
<td>40.00</td>
<td>44,000.00</td>
</tr>
<tr>
<td>R&amp;R 4&quot; Service Connections</td>
<td>EA</td>
<td>20</td>
<td>750.00</td>
<td>15,000.00</td>
</tr>
<tr>
<td>F&amp;I 4&quot; Asphalitic Concrete Pavement &amp; 8&quot; Base Course for trench work</td>
<td>SY</td>
<td>220</td>
<td>22.00</td>
<td>4,840.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; Base Course for Alley</td>
<td>SY</td>
<td>500</td>
<td>6.00</td>
<td>3,000.00</td>
</tr>
<tr>
<td>F&amp;I 4&quot; Asphalitic Concrete Pavement &amp; 6&quot; Base</td>
<td>SY</td>
<td>750</td>
<td>16.00</td>
<td>12,000.00</td>
</tr>
<tr>
<td><strong>Subtotal Between 4th &amp; 5th</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>90,840.00</strong></td>
</tr>
<tr>
<td>Alley Between 5th &amp; 6th (Mid Block North &amp; South)</td>
<td>$</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F&amp;I 48&quot; Dia. Manhole</td>
<td>EA</td>
<td>4</td>
<td>3000.00</td>
<td>12,000.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; PVC Sewer Main</td>
<td>LF</td>
<td>700</td>
<td>40.00</td>
<td>28,000.00</td>
</tr>
<tr>
<td>R&amp;R 4&quot; Service Connections</td>
<td>EA</td>
<td>6</td>
<td>750.00</td>
<td>4,500.00</td>
</tr>
<tr>
<td>F&amp;I 4&quot; Asphalitic Concrete Pavement &amp; 8&quot; Base Course for trench work</td>
<td>SY</td>
<td>220</td>
<td>22.00</td>
<td>4,840.00</td>
</tr>
<tr>
<td>F&amp;I 8&quot; Base Course for Alley</td>
<td>SY</td>
<td>1000</td>
<td>6.00</td>
<td>6,000.00</td>
</tr>
<tr>
<td><strong>Subtotal Between 5th &amp; 6th</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>55,340.00</strong></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>210,070.00</strong></td>
</tr>
<tr>
<td>10% Contingency</td>
<td>$</td>
<td></td>
<td></td>
<td><strong>21,007.00</strong></td>
</tr>
<tr>
<td>20% Engineering</td>
<td>$</td>
<td></td>
<td></td>
<td><strong>42,014.00</strong></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>273,091.00</strong></td>
</tr>
</tbody>
</table>
The final ingredient in developing the conceptual plan for the Downtown Revitalization Project is the evaluation of the pavement and concrete making up the streets and sidewalks in the downtown area. This section of the report provides the results of the streets and sidewalks analysis and presents the recommended improvements and corresponding cost estimates.

**Evaluation of Streets and Sidewalks**

There are approximately 5000 feet of paved streets in the downtown study area. The most heavily traveled streets are Birch and 4th Street, both of which are under the jurisdiction of the Wyoming Department of Transportation (WyDOT). All the streets are constructed of asphaltic pavement.

**Pavement Inventory**

The method used to evaluate the streets and sidewalks was a visual inspection made in the field. The criteria used for inspecting the pavement are summarized as follows:

- Amount of linear cracking
- Amount of longitudinal cracking
- Percent of roadway with random cracking
- Percent of roadway with patchwork
- Percent of roadway with rutting
- Percent of roadway with deformed cross section
- Percent of roadway with alligator cracking
- Percent of roadway with potholes
- Overall ride quality of roadway

Utilizing the above criteria, the roadways in the study area were divided into three separate classifications. These classifications are:

- **Good Condition** - roadway needs little or no work, shows few or no failures in pavement, and no apparent subgrade failures.
- **Marginal Condition** - roadway needs surface improvements, exhibits significant rutting and a few significant pavement or subbase failures.
Section 5

Concrete Inventory

Criteria used for evaluating the concrete sidewalk, curbs and gutters, and valley gutters are summarized as follows:

- Crack or cracks larger than hairline
- Adjoining edges with differing vertical alignment (>1/4-inch)
- Any segment with five or more holes in it (>1/2-inch diameter)
- Cracked, broken or missing pieces that interfere with traveling public
- Depression or grade problems which trap more than 1/4-inch of water
- Cross slopes greater than two percent
- Any segment that interferes with the grade of the sidewalk
- More than five percent spading
- Any segment with curb stops, valve boxes or manholes protruding 1/4-inch or more
- Stumps, stones or roots protruding
- Curb cuts which do not access property
- Handicap accessibility at all intersections

The concrete in the downtown study area was evaluated on a pass/fail system. If the concrete did not meet all of the criteria above, it failed.

Pavement and Concrete Recommendations

The pavement and concrete improvement recommendations are summarized on Figure 5-1. The rehabilitation recommendations for the paved areas are summarized below. It should be noted that Birch and 4th Streets are the responsibility of WyDOT. The only recommendations for Birch and 4th Streets are utility improvements and streetscaping as previously discussed.

- Good Condition - (colored brown) all of the areas identified to be in good condition require no rehabilitation or replacement.

Poor Condition - roadway needs replacement, exhibits pavement and subgrade failures, major cracking and poor ride quality.
Section 5  

Pavement/Concrete Analysis  

- Marginal Condition - (colored green) the roadway sections which are in marginal condition should be rehabilitated as follows: remove pavement and subgrade in areas of failures and replace with new section, rotomill the roadway section to provide a concise roadway cross section, overlay the section with a 1 1/2-inch asphalt pavement section.

- Poor Condition - (colored blue) the roadway sections identified to be in poor condition require complete replacement. The existing asphalt and base course should be removed and replaced with a new section of 12-inches of crushed base course and 4-inches of asphalt pavement. No area under the Town's responsibility was in poor condition.

In general, the paving improvements are recommended for 3rd St. - Cedar St. to Aspen St., 4th St - Birch St. to Aspen St., and 5th Street north of Birch. Rotomilling, crack sealing, paving membrane fabric, and a 1 1/2-inch overlay are recommended. Geotextiles may also be necessary where the subgrade soils are poor or wet.

The concrete which did not meet the previous criteria is shown in maroon. This includes sidewalk, curb and gutter, and few of the alley aprons. All of the concrete shown in maroon is in poor condition and should be removed and replaced. As with the proposed rebuilding of Aspen Street, the curbswalk on both sides will need to be removed and replaced to ensure positive drainage.

Estimated Costs

The pavement and concrete improvements are shown conceptually in Figure 5-1. A breakdown of the improvements including estimated quantities and unit costs are shown in Table 5-1. The total cost of the improvements is estimated to be $175,370. It is assumed that these improvements will be made concurrent with the utilities improvements. It should also be noted that the cost estimates assume WyDOT will be responsible for pavement and concrete improvements for Birch Street and 4th Street and the Town will pay for the utility and streetscape improvements.
Town of Glenrock Pavement and Concrete Analysis

Figure 5-1
## Table 5-1

Estimated Costs for Pavement and Concrete Improvements

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>UNIT</th>
<th>QUANTITY</th>
<th>UNIT COST</th>
<th>TOTAL COST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coldmilling</td>
<td>SY</td>
<td>2000</td>
<td>5.00</td>
<td>10,000.00</td>
</tr>
<tr>
<td>Crack Sealing</td>
<td>LF</td>
<td>3000</td>
<td>5.00</td>
<td>15,000.00</td>
</tr>
<tr>
<td>Paving Membrane Fabric</td>
<td>SY</td>
<td>9400</td>
<td>3.00</td>
<td>28,200.00</td>
</tr>
<tr>
<td>1 1/2 - inch Overlay</td>
<td>SY</td>
<td>9400</td>
<td>5.00</td>
<td>47,000.00</td>
</tr>
<tr>
<td>Remove and Replace Curb and Gutter</td>
<td>LF</td>
<td>500</td>
<td>10.00</td>
<td>9,500.00</td>
</tr>
<tr>
<td>Remove and Replace Sidewalk</td>
<td>SY</td>
<td>900</td>
<td>28.00</td>
<td>25,200.00</td>
</tr>
<tr>
<td>SUBTOTAL</td>
<td></td>
<td></td>
<td></td>
<td>$134,900.00</td>
</tr>
<tr>
<td>10% Contingency</td>
<td>$</td>
<td>13,490.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>20% Engineering</td>
<td>$</td>
<td>26,980.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>$</td>
<td>175,370.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Section 6  
Scheduling and Phasing

This section of the report presents a summary of project costs and a possible schedule for implementing the Downtown Revitalization Plan.

Estimated Project Cost

The estimated costs for design and construction of the project is summarized in Table 6-1. The total cost for the project is estimated to be $3,965,726.

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Estimated Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water System</td>
<td>$577,265.00</td>
</tr>
<tr>
<td>Sanitary Sewer System</td>
<td>$273,091.00</td>
</tr>
<tr>
<td>Pavement and Concrete</td>
<td>$175,370.00</td>
</tr>
<tr>
<td>Streetscape and Landscape</td>
<td>$2,940,000.00</td>
</tr>
</tbody>
</table>

Total Project Cost $3,965,726.00

Project Scheduling

There are two important considerations in developing a schedule for constructing the project. One is the WyDOT’s scheduling for roadway improvements for Birch Street (US Hwy 20/26) and 4th St. Discussions with WyDOT representatives indicate the improvements are planned for the year 2004. The second consideration is the high total cost of the project which approaches $3.97 million. This high cost and limited funding availability will most likely result in funding acquisition requiring a two or three year period. Therefore, it is assumed the project will be constructed in several smaller projects and phased to match funding availability.

Obviously, there are several scenarios for phasing the project. The most common approach is to begin the utility replacement either ahead of or concurrent with the street paving and concrete improvements. Due to the high cost of the streetscaping and landscaping this work has been broke out as its own phase. The extent and amount of streetscaping work can be determined once the amount of available funding is accumulated. The streetscape and landscape improvements can be constructed after or concurrent with the street paving improvements.
Phase 1

Due to the immediate concerns and needs, Phase 1 would include design and construction of all of the water main work, the sanitary sewer crossings for Birch Street, and street paving/concrete improvements for the project area. The estimated project cost for Phase 1 is $797,095, as shown in Table 6-2 (Refer also to previous cost breakdowns in Sections 4 and 5).

<table>
<thead>
<tr>
<th>Description</th>
<th>Estimated Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd Street Water Line</td>
<td>$62,600.00</td>
</tr>
<tr>
<td>4th Street Water Line</td>
<td>$71,750.00</td>
</tr>
<tr>
<td>5th Street Water Line</td>
<td>$105,500.00</td>
</tr>
<tr>
<td>6th Street Water Line</td>
<td>$18,200.00</td>
</tr>
<tr>
<td>Birch Street Water Line</td>
<td>$186,000.00</td>
</tr>
<tr>
<td>Sanitary Sewer Crossings on Birch Street</td>
<td>$34,200.00</td>
</tr>
<tr>
<td>Pavement and Concrete Improvements</td>
<td>$134,900.00</td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td><strong>$613,150.00</strong></td>
</tr>
<tr>
<td>10% Contingency</td>
<td>$61,315.00</td>
</tr>
<tr>
<td>20% Engineering</td>
<td>$122,630.00</td>
</tr>
<tr>
<td><strong>Total Phase 1</strong></td>
<td><strong>$797,095.00</strong></td>
</tr>
</tbody>
</table>

Phase 2

Phase 2 includes the remaining sanitary sewer replacement work in the study area. The estimated cost for Phase 2 is $228,631.

Phase 3

Phase 3 is the final phase and would include construction of the streetscaping improvements along 4th and Birch Streets. The estimated project cost for Phase 3 is $2,940,000. This work will be done as part of the WyDODT roadway construction project. The extent and scope of work will depend on the amount of funding available at the time of construction.