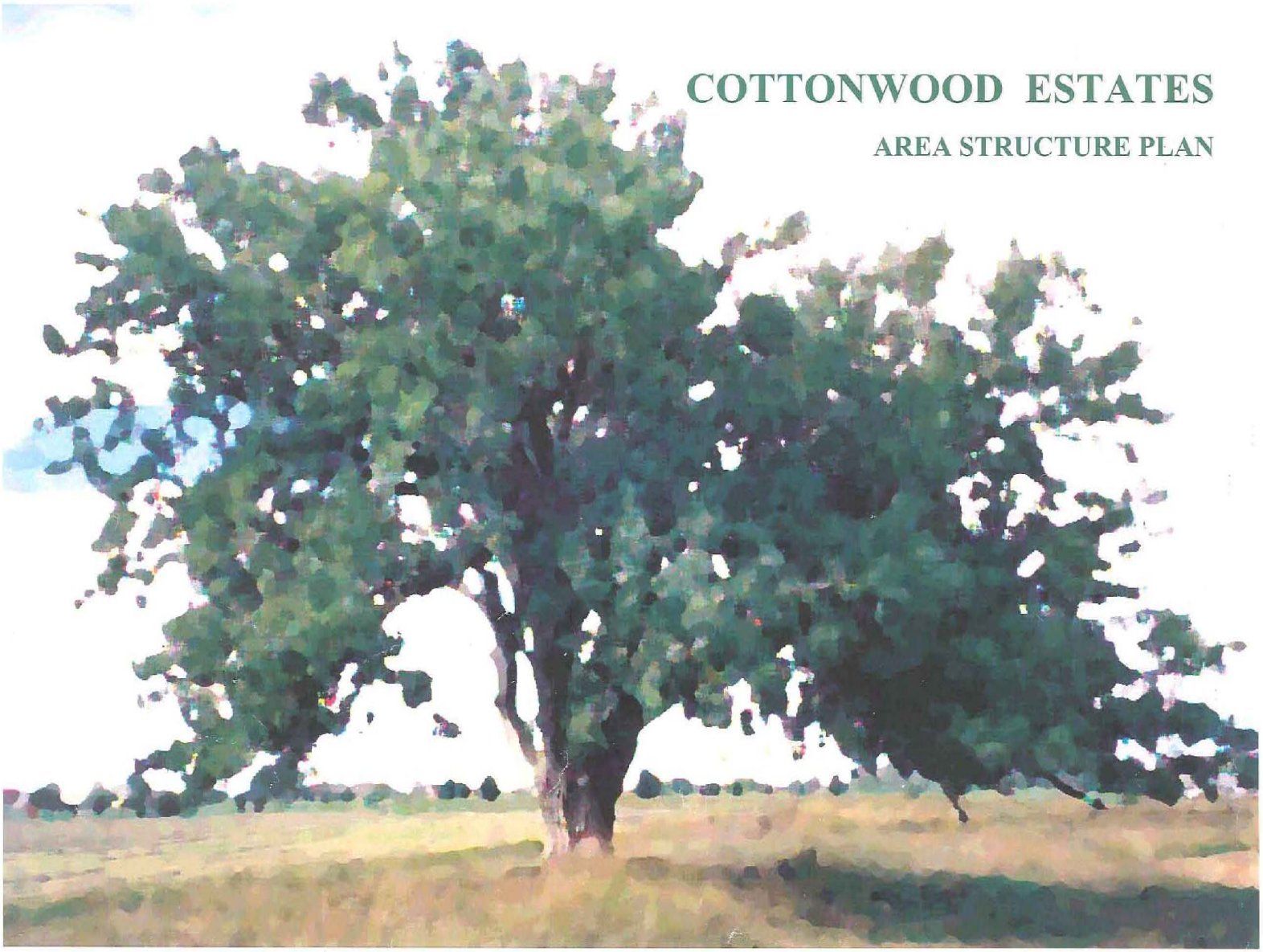
COTTONWOOD ESTATES

AREA STRUCTURE PLAN



TOWN OF COALDALE

COTTONWOOD ESTATES
AREA STRUCTURE PLAN

- October 31, 2005 -

BYLAW # 547-P-06-05

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1) Purpose

Cottonwood Area Structure Plan has been produced in accordance with Section 633 of the Municipal Government Act to create a framework for the future subdivision and development of a new neighbourhood in south-central Coaldale. It is thus intended that the plan identify and provide for a range of development opportunities on previously undeveloped agricultural land.

2) Location , Area & Ownership

Blair Frache, through his company, 324700 Alberta Limited, is the registered land owner of Cottonwood Estates. Wholly located within the Southeast Quarter of Section 10, in Township 9, Range 20, West of the 4th Meridian (10-9-20), the development area contains 150.76 acres (61 ha.) more or less *(please refer to Figure 1)*.

Land title *exceptions* include property taken for irrigation purposes (8 acres or 3.25 ha.) and road widening (1.24 acres or 0.502 ha.) In addition, there have been utility rights-of-way granted to the Town of Coaldale, the County of Lethbridge and Canadian Western Natural gas Company Ltd *(Please refer to Figure 2)*. St. Mary River Irrigation District has placed an irrigation order/notice indicating that the property has irrigation rights associated with it *(please refer to Appendix #1)*.

3) Area Structure Plan Goal

The Goal of the Cottonwood Area Structure Plan is to establish a strategic framework that will enable the development of a neighbourhood of enduring quality.

4) Area Structure Plan Objectives

Cottonwood Estates Area Structure Plan will respond to the needs, issues and requirements identified by 324700 Alberta Ltd., the Town of Coaldale and those agencies, organizations and individuals having an interest in the planning of this area. The subdivision will evolve over a period of time to become a fully integrated neighbourhood within Coaldale.

To facilitate neighbourhood integration, this Area Structure Plan will endeavour to:

1) guide the agricultural to urban development transition in an orderly and economical manner;
2) mesh the development pattern and circulation system with that of surrounding, existing development;
3) create a residential neighbourhood that includes a mix of dwelling types and densities;
4) incorporate other compatible land uses as required;
5) establish the supporting internal transportation network and public utilities;
6) institute a storm water management system that responds to both public utility and amenity functions;
7) provide and distribute open space and a trail system that connects this neighbourhood with adjacent neighbourhoods;

8) utilize water from the SMRID irrigation system for park and lawn watering purposes rather than treated Town water;

9) create distinctive residential enclaves by establishing design themes and development standards, implemented through architectural controls and the land use bylaw;

10) propose a development phasing system;

11) design in greater detail, the potential first stage of the first phase and the balance of the property in a more conceptual manner;

12) provide sufficient flexibility to accommodate design adjustments which respond to future market conditions, in keeping with community goals;

13) describe an implementation program that guides future land use classification and subdivision

5) Existing Conditions & Development Considerations

a) Site evaluation

Mr. Frache is nearing completion of a new home in the southwest corner of the property which will be easily incorporated into the future subdivision design. The former Kasner home site occupies a tree-lined portion of the northeast corner of the property. An abandoned farmstead contains some hay storage and newer grain bins but otherwise, the balance of this area is cluttered with obsolete farm equipment, several old buildings, corrals, and a small livestock watering pond. Mr. Frache is currently in the process of cleaning up this area.

Currently, a majority of the site is used for agricultural purposes and a small pasture lies north of the minor irrigation canal which is the water delivery conduit for some water users east of Highway 845. The remainder of the site, south of a farm irrigation ditch, has most recently produced hay and grain crops.

Several other features on or adjacent to the site must be taken into account as the land is developed in the future *(please refer to Figure 3 & 4)*.

i) Topography

The natural topography of the development area has been altered to facilitated irrigation farming. Although relatively flat, the land does slope from west to east and the changes approximately five meters in elevation. The topography is further influenced by irrigation works on or adjacent to the property *(please refer to Figure 5)*.

ii) Irrigation Works

Entering the site at the northwest corner and stretching along the entire northern property line, a 30 meter wide St. Mary River Irrigation District (S.M.R.I.D.) canal (IRR 126 Y & IRR 56 L) is the most prominent irrigation feature. This location is also the official delivery point to the quarter section and three structures along the canal control water flow. The canal is a built-up dike type of structure and its back-slope will be a consideration in determining future lot dimensions and setbacks due to anticipated storm water and snow melt run-off. Currently, the flow structure/turn out mid-way along the northern property line, near 22nd St., is used by pedestrians to cross canal.

The width and depth of the canal would require bridging structures at 22nd Street and at Fairway Drive which are two potential crossing locations. These would also be logical crossing locations for other utility service connections. A smaller delivery ditch that is currently used to fill the stock watering dugouts in the old farmstead and provides service delivery for two parcels east of Highway 845.

There is also a ditch-rider service road along north side of canal which may be a possible feature in the future open space system in this part of town.

The cumulative effect of these irrigation works will have a bearing on future land use, access, utility extensions and storm water management of the development area.

iii) Rights-of-way

(a) Trunk sewer facilities

Trunk sewer facilities in a right-of-way, which services the Land O' Lakes subdivision, traverse the site in an east-west direction in alignment with 30th Avenue, east of the development area. With a fixed location, this major utility lies within a 10 meter sewer line (right-of-way Plan #851 0909). The linear nature of this right-of-way presents a constraint in the subdivision design since it cannot be relocated and must be preserved in a road or other linear site element.

However the presence of the sewer within the site can also be considered an asset since it has sufficient capacity to service the development area.

(b) Treated water

Treated water flows through a pipeline conveying water from the City of Lethbridge to Coaldale and the McCain potato processing plant east of Town, near Chin. This pipeline is situated in a right-of-way (plan #001 0145) which varies in width from 10 to 20 meters. The pipeline enters the development area at the southwest corner through a 10 meter right-of-way and proceeds easterly along the southern property line to the midway point where it turns north. The pipeline then becomes 20 meters in width in a north-south alignment which extends to the midpoint of the 1/4 section. The right-of-way then turns to the east, is reduced in width to 10 meters again and runs immediately parallel to the 10 meter sewer line right-of-way. The water pipeline right-of-way extends to Highway 845 and aligns with 30th Avenue to the east.

Together with the 10 meter sewer right-of-way, the combined 20 meter fixed-location right-of-way creates a further constraint in the subdivision design as it too must be preserved in a road or other linear site element.

Again, as with the sewer, the location of potable water on-site is an asset for developing the site since there is sufficient capacity within this waterline to satisfy both the domestic and fire flow requirements.

iv) Other utilities

Several other public utility installations or features are situated on or near the plan area that will provide service connections or otherwise influence site development.

(a) Electrical distribution

Electrical distribution in the area is supplied by Fortis Alberta United Inc. with power lines constructed along the northern, southern and eastern edges of the development area.

(b) Telephone cable

Telephone cable is buried along the east side of the development area as well as within developed areas to the north, east and west of the development area.

(c) Natural gas,

Natural gas through an ATCO Gas pipeline is currently situated just west of the S.M.R.I.D. turnout on the northern site boundary as well as in developed areas to the north, west and east.

v) Roadways and Access

(a) Town Streets

Currently, no Town streets extend into the development area, however several streets provide openings that would facilitate future access.

b) Highway 845

Highway 845 becomes Twentieth Street north of the main S.M.R.I.D. canal, forms the easterly site boundary. Two further access points intersect with 20th Street ; both of which where the old farmstead is located. Highway 845 is posted as a 50 km zone within town limits and is a designated truck route at the present time. With these factors in mind, longer residential lots or deeper setbacks are design and development considerations.

Both existing and potential future access points are controlled by Alberta Infrastructure and Transportation since this is a Secondary Road in the Provincial highway hierarchy.

(c) Future Connection to Highway 3

Functional Planning for Highways 3 and 845, conducted by McElhanney Consulting Services Ltd. for Alberta Transportation and Infrastructure and the Town of Coaldale in 2004, indicated a future connection between 30th Avenue to 30th Street and Highway 3 through the development area.

This road, if constructed would have a negative effect on the future residential neighbourhood envisioned for the Cottonwood Estates area. It would not be reasonable to expect that costs associated with constructing this potential Town arterial roadway would be borne by the developer.

(d) County of Lethbridge Township Road 9-1

Township Road 9-1, situated along south boundary of the plan area, is a narrow,"forced road" that is also the Town-County boundary. This paved County road is somewhat of a crescent as it heads west, then south and then east again, where it becomes Township Road 9-1 and returns back to Highway 845.

The road provides access to an abandoned farmstead, used for apiary purposes and an operational farmstead with associated agricultural land to the south of the development area and a vehicle wrecking operation at the same location.

b) Land O'Lakes

Land O'Lakes residential subdivision and golf course lies directly west of the development area. There are several aspects of Land O'Lakes that will influence the manner in which Cottonwood Estates will be planned and developed.

As previously mentioned the potential for access to and from Fairway Drive is a significant design consideration because this location is ideal for both an appropriately situated access and an aesthetically pleasing entrance into the subdivision. The Town and Land O'Lakes should use this

access point to replace the one currently indicated as entering at the southwest corner of Cottonwood Estates as an extension of the southeast arm of Fairway Drive.

The expanse and views created by a golf course contribute to a very desirable real estate situation. Land O'Lakes Golf Course was planned and designed to maximize residential exposure to the park-like quality it provides. This situation extends to land within Cottonwood Estates that is adjacent to the golf course, particularly along most of the west site boundary.

While the golf course provides an attractive feature, it also presents a design constraint. Fairways 14 and 15 can be challenging for some golfers whose golf balls often extend a considerable distance in the adjacent field to the east. Future lots along these fairways will thus likely have to be somewhat deeper to overcome the menace posed by errant golf balls. A barbed wire fence currently demarcates the property line.

Other golf course features to be aware of as future lot layouts are considered include the irrigation pump house about 200meters north of the southerly 1/4 section line near the west boundary of the development area. The tee-box for the 16th fairway is situated near the southwest corner of the development area close to where Fairway Drive has been designed to be extended eastwards. This is also the nearest location of Land O'Lakes homes to future Cottonwood development.

c) Adjacent Residential Development

Two blocks of various sized and shaped lots, face 24th Avenue. Several lots, near the northwest corner of the development area also face either 25th Avenue or 23rd Street, both of which truncate where they intersect each other. An R-2 zoned area comprised of 6 villa-like semi-detached dwellings is situated between 24th and 25th Avenues and 22nd and 23rd Streets as well. Three newer single detached dwellings facing Fairway Drive are positioned near the entrance to Land O' lakes where a potential access point to the development area is situated.

Most of these lots are physically separated from the plan area by the S.M.R.I.D. canal and a town lane. Varying from 30 meters in the laneless areas to 38 meters where there is a lane, this separation currently functions somewhat like a combined green strip, walkway and wetlands area along the canal. Several lots in this area have detached garages that utilize the lane for access as does the Town solid waste collection operation. These lots are lower than the top of the irrigation canal but the distance from the canal and local grades tend to compensate for potential flooding events.

d) Natural Features

Natural features in and around the development area are limited as virtually all existing wetland or tree growth can be attributed to the presence and availability of irrigation water. Marsh-like vegetation is found on either side of the S.M.R.I.D. canal and a lateral ditch that winds across the development area and the old farmstead ponds.

There is a character cottonwood tree, for which the subdivision is currently named, near the northwest corner along the winding irrigation lateral. This old tree is an existing focal point as evidenced by the informal pathways that lead to it from the minor canal crossings at Fairway Drive and at 22nd Street. There is also a discontinuous tree stand of old Cottonwoods around the old farmstead. These old Cottonwoods while providing character to the area, are nearing the end of their life span however subdivision design and development activity should be carefully undertaken to preserve them as long as possible.

6) PLANNING CONTEXT

a) Town of Coaldale Municipal Development Plan (M.D.P.)

In addition to the requirements of the Municipal Government Act, this Area Structure Plan has considered the Town of Coaldale Municipal Development Plan and incorporated those applicable features or requirements that pertain to the long-range, detailed planning of the Cottonwood Estates development area.

Among those features of the Coaldale M.DP. that have been included are the following;

- direction of community growth
- population change and structure
- construction activity
- housing trends
- economic development influences
- transportation routes
- specific land use requirements
- open space requirements and trends
- urban and rural interface challenges and opportunities

b) Level of Planning Detail

In the preparation of an Area Structure Plan, The Town of Coaldale requires a level of detail that will enable Town staff and its planning and engineering advisors to evaluate the proposal as if it were at a detailed "Outline Plan" level. At this level of planning, the transportation circulation system together with the master servicing planning for storm water management, sanitary sewer collection, water distribution is well advanced.

7) LAND USE CONCEPT

The Land Use Concept described below is graphically illustrated on Figure 6.

a) Overview Of Proposed Land Uses

i) Residential Development

(i) Housing demand

Housing construction in Coaldale has hovered around 30 dwelling units per year in recent years, while reaching 38 units in 2004. Within the development area, Cottonwood Estates has the land base to help satisfy long term housing needs in Coaldale. Future new home construction will be subject to a variety of factors. Demographic change will influence both the number of dwelling units and the number of persons per dwelling unit as the seniors' population increases, for example. Low interest rates, a healthy agricultural sector and other economic factors including new job creation, in and around the community, can be expected to continue to influence the residential market in Coaldale. Continued growth and development within the City of Lethbridge may also influence the housing market in Coaldale.

Cottonwood Estates will be designed to respond to the housing needs of both current and future Coaldale citizens. Single detached and multi-unit dwellings will reflect Coaldale's current and anticipated housing mix which generally ranges between 90%-95% single detached and 5%-10% multi-unit. Based on potential subdivision layouts, Cottonwood Estates would create between 450 and 500 dwelling units. The gross housing density of the development area would thus be approximately 7 units per hectare or about 3 units per acre. If a School site is not required, the housing density would

marginally increase to 8 units per hectare or just over 3.1units per acre. Based on an average of 3 persons per dwelling unit, the population that could be accommodated in the development area would be in the range of 1350 to 1500. Once roads, utility rights-of-way, open space and other land uses are factored in, the net density would be between 4.2 and 4.5 units per acre (10.4 and 11.1 units per hectare).

(ii) Neighbourhood Character

Low density, single dwelling unit development will predominate within the development area. Although there will be four general ranges of lot size, subdivision design is somewhat flexible so that lot sizes can more easily be adjusted for anticipated future conditions. Generally, lot sizes will be larger than comparable lots in other parts of town. This will contribute to the spacious experience of the overall development.

Storm water management requirements and utility rights-of-way have produced further opportunities to create open spaces adjacent to significant amounts of residential development. The cumulative effect of these open spaces will contribute to a more park-like character throughout the development area.

Even though Cottonwood Estates will be a low density neighbourhood, a majority of the subdivision is intended to be laid out with an east-west street orientation which will enhance solar access should homeowners wish to take advantage of the opportunity thus provided.

Further neighbourhood enhancement will result form the creation of gateways at entrance locations, especially near Fairway Drive and at 20th Street (Highway 845). Creation and landscaping of roadway medians and boulevards will further enhance the atmosphere of the new neighbourhood.

(iii) Lot Types

1. Estate lots

Estate lots are intended to provide spacious sites to satisfy upper-end housing demand in Coaldale. Lots will range between seventy-five to one-hundred meters in depth. Deeper lots are also intended to compensate for errant ball-flight from adjacent golf course tees and fairways. Lot widths will be determined at the tentative plan stage but are likely to vary somewhat to allow for marketing flexibility. Moved-in buildings would not be desirable as a discretionary use in this area. Building setbacks will be an important consideration in this district to ensure that errant golf-balls are avoided as much as practical.

2. Large lots

Large lots are intended to provide sizeable sites to satisfy upper-end housing although on smaller than estate size lots. These lots range between sixty and eighty meters in depth and are located adjacent to the S.M.R.I.D. canal along the northern edge of the development area. These lots are relatively deep to take advantage of the amenity value of the canal and to assist in the drainage attributable to canal back slope and to provide space for a potential underground domestic irrigation pipeline. Although possible as a discretionary use, "moved-in buildings" would not be desirable as a discretionary use in the plan area.

3. Enhanced setback lots

Enhanced setback lots will be those backing onto Highway 845 or other locations that warrant an enhanced setback. These lots will likely be in the range of fourty-five to fifty meters in depth. This extra depth is intended to provide added sound attenuation value. Lots that back onto the County of Lethbridge township road will also in the fourty-five meter depth range. This depth will provide an extra setback that may possibly be required for road widening or utility extensions in the future. Unless a new land use district is created to account for the proposed lot dimensions, these lots would fall within the Residential R-1A District of Land Use Bylaw 469-P-10-00. If the land is needed for road widening, it should be acquired at the time of subdivision.

4. Standard lots

Standard lots would also fall within the Residential R-1A District of Land Use Bylaw 469-P-10-00. Within the development area, these lots are intended to be fourty meters deep, which is six and one-half meters deeper than the Bylaw minimum.

5. Multi-unit dwelling sites

Multi-unit dwellings will be dispersed throughout the development area rather than concentrated in one or two locations. Multi-unit residential may consist of plus fifty-five, adult villa and senior sites; a possible seniors village as well as family-oriented housing.

Sites will be conveniently located and strategically placed near collector roads and open space. Designated multi-unit sites in the Area Structure Plan will be designed with sufficient flexibility to enable conversion to lower density residential to respond to market conditions. If this occurs,

replacement multi-family sites will be considered elsewhere in subsequent phases of development on low density "swing" site locations in order to maintain the appropriate housing mix. Multi-unit dwelling lots would likely be classified Residential Multi-family R-2.

(iii) Lane accessed lot demand

Laned-accessed lot demand within the development area is not expected be as great as in other parts of town since lots will be large thus reducing the need for secondary access. Nevertheless, Cottonwood Estates will provide a mixture of laned and laneless opportunities to enhance marketing options.

ii) School Site

A school site, likely for a public elementary school, of between 4 and 5 hectares is planned north of 30th Avenue between 20th Street and the north-south collector road to the west. The school is expected to be necessary within 5 to 10 years. It is not expected that there would be a direct access to the school site from 20th Street.

If required, storm water detention could be provided on the school site. This facility would be a managed facility that would normally be dry except for rain or snow melt events. Sportsfield development for both the school and the community could also be designed within the school site and would likely overlap with the storm water management facility.

This site would be designated for municipal reserve, school reserve, a public utility lot or a combination thereof. It is anticipated that the land would only be designated upon the need for its use for these community purposes. If the required ten percent municipal reserve is provided as open space elsewhere

in the plan area, this site would have to be purchased from the developer. If the school site is designated, it would be classified under the Land Use Bylaw as Institutional/ Recreational (I-R).

In the event that the land is not required for community purposes, a "shadow plan" of the area should be contemplated so that the land is not unduly detached from and would function with the remainder of a residential neighbourhood.

iii) Parks, Open Space, & Walkways

Parkland and related open spaces will occupy nearly 9 hectares (22 ac.) of land within the development area. Subdivision regulations require ten percent of the development area, approximately six hectares, to be provided for Municipal Reserve and or School Reserve. If a school site of four hectares is dedicated, only two hectares will remain for other public open space. However, this amount of space may be inadequate for the kind of neighbourhood Cottonwood Estates is intended to be. To help resolve this situation, much of the land that is being provided for storm water management and other utility rights-of-way will be amalgamated with dedicated municipal reserve to provide multi-purpose open space. Any open space provided beyond the required 10% would be provided at the developer's prerogative.

Open space will be available for active and passive recreational use but will also provide for the movement and detention of storm water during rainstorm and snowmelt events. The system of integrated open space thus provided extends throughout the development area and is either adjacent to or within short walking distance of all lots within the neighbourhood. Walkway connections have been

allowed for at several locations to both facilitate accessibility within the neighbourhood and to adjoining areas of the larger community.

Efforts will be made to preserve existing trees wherever possible since this vegetation helps establish character to the development area. Although not part of the development area, the adjacent S.M.R.I.D. canal right-of-way contains marshland habitat that provides amenity value to the entire community. Currently used by town residents, the existing "ditch-rider" road is a recognized pathway along this marshland. The S.M.R.I.D. will continue to utilize this roadway and its foremost purpose will be for irrigation facility maintenance access.

An irrigation check structure at the mid-way point of the canal is more or less in line with 22nd Street. This narrow, dam-like structure is used as an informal crossing of the canal. Whether or not 22nd Street is extended into the development area in the future, this spot would continue to be a good location for a pedestrian crossing. For this to happen, the S.M.R.I.D. would require an appropriately engineered bridge structure.

b) Road Network

The road network described below is illustrated on Figure 7.

i) Roadways & Access Points

(1) Access to Development Area

(a) Fairway Drive, Twenty-second Street & Twenty Fourth Street

Fairway Drive, 22nd Street and 24th Street are adjacent to the Cottonwood development area and present excellent opportunities for future access. Twenty-Fourth Street evolves into Fairway Drive as it enters Land O'Lakes near the Northwest corner of the development area. With a suitable land acquisition north of the SMRID canal, and with the construction of an appropriate crossing of the canal, this area of the site will become a prominent entrance into the new subdivision. This location also provides a suitable location for pedestrian access to the north.

Twenty-second Street is situated mid-way along the northern site boundary and is developed as far as the east-west lane serving the lots fronting onto 24th Avenue. An extension of this street into the development area would assist in the distribution and balancing of traffic originating from or destined for the Cottonwood Estates. As with the crossing connecting with Fairway Drive/24th Street, an appropriate canal crossing would be required. This centralized location also provides a very good placement for pedestrian access to the north for schools, parks and commercial areas.

At the time Land O'Lakes was planned, Fairway Drive was designed to extend into the Cottonwood Estates development area to provide connectivity between the Southeast and Southwest 1/4's of Section 10. Fairway Drive currently extends nearly to the east edge of the Southwest 1/4 where it terminates in

a cul-de-sac. The potential extension of Fairway Drive into Cottonwood Estates will be precluded by officially closing the road beyond where it currently ends in a cul-de-sac.

(b) Twentieth Street/ Highway 845

Provision has been made for widening 20th Street along the eastern part of the plan area however this widening will eventually need to extend a bit further along past the existing farmstead and the canal to the north. The existing site access that currently intersects with 20th Street at 30th Avenue will become a primary access route for the Cottonwood Estates development in the future.

Normally Alberta Infrastructure and Transportation, which is the road authority, would prefer access to Secondary Roads at spacings of 400 meters in urban density situations. Existing access points may possibly remain however, until development intensifies to a level where it is advisable to truncate inadequately spaced access. No other direct access will be permitted by Alberta Transportation, thus other access options have to be evaluated. One such option is a service road parallel to Twentieth-street as part of the internal circulation system. This particular option does not appear to be a suitable alternative when considered in conjunction with the internal circulation system proposed for the development area.

(c) County Township Road 9-1

The County Township Road may eventually provide an alternate means of access for southbound and eastbound traffic. This southern access would interconnect with the internal road network within the plan area. If this road is ever considered to become more than a localized rural road, it would have to be widened to an appropriate width.

This right-of-way is ample enough to provide for road widening. An equally wide strip of land along the eastern half has been reserved for road widening and to provide sufficient space for appropriate development setbacks.

In addition, appropriate discussions and agreements between the Town of Coaldale and the County of Lethbridge would need to take place.

ii) Circulation Within Development Area

(1) Roadway Hierarchy

Cottonwood Estates will utilize a circulation system consisting of three levels of roadway and an integrated pathway system. These levels include: major collector; minor collector and local roads which are illustrated on Figure 7.

(2) Major Collector Roadways

Gently curving through the development area will be a 23 meter street that connects major access points at Fairway Drive to the west and 30th Avenue to the east. These streets are proposed to be widened to as much as 30 meters to allow for channeled traffic lanes and landscaped gateway features. This major collector road is intentionally curved to create a more pleasing streetscape and to assist in reducing traffic speed. Such intersection spacings range from a minimum of 75 meters to a maximum of 270 meters. There are three 4-way intersections with the major collector within the development area. All intersections between the major collector and other collectors are designed at or very close to 90 degrees.

Direct access from individual lots has also been somewhat limited to minimize future intersection congestion, and to maximize the carrying capacity of the road without reducing the quality of life of future residents on adjacent lots.

Residential lots near the 20th street access have been designed as reverse frontage lots so that they will not access the major collector but the minor collector to the south instead. Residential driveways should be restricted so that they are not within 30 meters of an intersection with the major collector.

Road right-of-way width may be slightly increased at both the Fairway Drive and 30th Avenue accesses to permit construction of subdivision gateway features. There is currently a noteworthy grade

difference between 20th Street and the proposed major collector. This grade difference will be reconciled as part of the earth balancing that will be required on the site.

(3) Minor Collector Roads

Minor Collector roads will provide an intermediate level of access within a 20 or 23 right-of-way. Collector roads within Cottonwood Estates are designed as a northerly section providing good vehicular access from the school site to the major collector and Hwy 845 and a southerly concentric inner-ring roads with which all local roads will intersect.

A northern section of the of the collector system stretches from Hwy 845 westerly, then southerly along the west side of the school site connecting to the major collector.

The southerly inner ring loops around the central area south of the major collector with which it intersects at two locations. Provision has been made for a connection to the County township road at the midway point along the southern boundary.

These collector roads will all provide direct access to adjoining lots.

(4) Local Roads

Local roads consist of a variety of configurations including crescents and cul-de-sacs that provide access to adjacent lots, normally within 16.5 meter. These streets will convey traffic to collector roads and by virtue of their narrower width, the maximum operating speed would be 50 kilometers per hour.

This level of roadway will include more 4-way intersections. Intersection spacing is intended be not less than 80 meters. Cul-de-sacs range from 65 meters to 125 meters in length and the minimum cul-de-sac bulb radius would be 15 meters. The furthest distance any lot is anticipated to be from an intersection is approximately 200 meters.

(5) Pathway System

Non-motorized access within the development area will take place through a series of pathways that are integrated with the open space system. These pathways will connect with park spaces, the future school site, the commercial site and public use site thorough both the parks and the stormwater management facility areas. The S.M.R.I.D. ditch rider road could further augment this system. Links with other neighbourhoods will be made possible in conjunction with the street system and through walkway breaks in development.

Because this system will rely on stormwater routes, construction of walkways should ensure usability except in high water storm drainage situations where the utility function would need to prevail. Surfacing should also ensure that all weather use is possible. Intersections of pathways and roadways would generally occur at street intersections except where there is a stormwater route or utility corridor interface.

c) General Servicing Concept & Phasing

i) Sanitary Sewage Collection

The following section is a general description of the sanitary sewage collection system. The system is illustrated in Figure 9 while details of the system are contained within the Master Servicing Plan from Martin Geomatics Consulting Ltd. Found in Appendix 2.

Sewage generated within the development area will be collected in pipelines that will connect with the existing 250 mm sanitary sewer that services the Land O'Lakes subdivision. Sewer lines will normally be a minimum of 200 mm in diameter. This collection system will rely on gravity flow, has been sized to accommodate the levels of service required within the development area and will follow the road network. Sewer line depth will become shallower towards the east edge of the development consequently careful site grading will be necessary at to ensure appropriate sewage flows.

Foundation drainage connections to the sanitary sewer will not be allowed by the Town of Coaldale due to a lack of capacity in the sanitary system downstream from the Cottonwood Estates development area.

ii) Water Supply And Distribution System

The following section is a general description of the water supply and distribution system. This system is illustrated on Figure 10 while details of the system are contained within the Master Servicing Plan from Martin Geomatics Consulting Ltd. Found in Appendix 2.

Domestic water supply will originate from the treated pipeline already located in the development area. The water distribution system will follow the road network and has been sized to accommodate the levels of service required within the development area. These service levels will be compliant with Alberta Environment and Town of Coaldale standards.

iii) Storm Water Management System

The following section is a general description of the storm water management system. The system is illustrated in Figure 11 while Details of the system are contained within the Storm Water Management Plan from Martin Geomatics Consulting Ltd. found in Appendix 2.

Storm water management is the single-most critical determinant in the planning and subdivision design of Cottonwood Estates. Storm water management facilities (SWMF) use large quantities of land thus influence lot yield and servicing costs within the development area. To ensure property is safe from flooding, storm water passage routes require additional land and must be carefully considered otherwise land could be wasted and unnecessary site grading may take place. Storm water management facilities also significantly influence the amount of park space, its location and how it is developed.

Cottonwood Estates development area appears to be relatively flat but declines five meters, across a gradual slope, from west to east where two prominent low spots become apparent along the easterly edge. The existence of S.M.R.I.D. works adjacent to and within the site presents a dam-like effect that hinders drainage. To further complicate the situation, natural drainage through the development area and adjacent land to the south, in the County of Lethbridge, has been altered by the construction of Highway 845 and the dam-like effect it has. The cumulative effect of this situation will therefore require both short term and long term solutions for storm water management.

Through site grading and swales in linear open spaces, storm water will be conducted to two SWMF's. The first facility, a dry pond of approximately 16,000m^3, will be situated in the north-central portion of the plan area within a site of about 2 hectares. A second, larger dry pond of 36,000 m^3 will be required on the east central side of the plan area within a site area of approximately 2.4 hectares.

The southeast corner of the site will function as a storm water detention area until a long term solution to a comprehensive South Coaldale storm water management that has been determined.1. Construction of housing will be precluded until the long-term storm water solution has been derived.

Roadways within Cottonwood Estates will be developed to an urban, standard with curb and gutter, thus there will be no roadside swales as part of the stormwater management system however, there will

be detention capability designed into the pathway system. With appropriate surface grading, early phases of development are not expected to require fully developed storm water management facilities since there will be a great deal of vacant, arable land to absorb surface runoff.

The Town of Coaldale has indicated that it will manage off-site storm water runoff that cannot be managed within Cottonwood Estates, in a staged fashion dependent upon the availability of the necessary funding and/or upon reaching an agreement with the County of Lethbridge. The Town has also indicated it's willingness to negotiate with the developer of Cottonwood Estates for the cost of providing additional storage.

Buildings and critical improvements, including infrastructure, will be required to be constructed at elevations that would protect them from any flooding that may result from a 1:100 year storm event.

iv) Shallow Utilities

Shallow utilities, including electrical services, natural gas, telephone and cable required to service Cottonwood Estates will be extended into the development area in consultation with the respective utility companies. These utility rights-of-way will be required for all shallow utilities and will not be within road rights-of-way. Details will be determined at the subdivision stage.

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1 Town Council has requested the developer of Cottonwood Estates to work with Operations & Engineering Services Committee to ensure that a reasonable amount of staged detention or retention storage is provided for runoff entering the development area from the County of Lethbridge.

v) Domestic Irrigation

Agricultural land within Cottonwood Estates is currently irrigated and the development area also contains irrigation works that convey water to downstream users. Preserving the continuity of irrigation service to downstream users, when no longer needed for agricultural purposes in the development area, is a mandatory requirement of the irrigation district. The S.M.R.I.D. has indicated that a flow rate of 150 USGPM will be necessary for close to five hectares of irrigable land in the Southwest 1/4 of Section 11, Township 9, Range 20, West of the 4th Meridian.

The ability to carry on using irrigated water for domestic purposes is also an advantage for the development since more expensive treated water would otherwise be used for residential and parkland lawn watering. Current alignment of the downstream supply as well as its open ditch method will both be replaced by a new, subsurface pipeline designed to S.M.R.I.D. specifications.

d) Sidewalks, Street Lighting and Road Standards

Together with street lighting, sidewalks are intended to be provided throughout Cottonwood Estates. Cross-sections that indicate locations, widths, depths of the appropriate features are provided in Appendix 4.

e) Potential Staging

Future subdivisions will comply with the land use concepts of figure 6, road design of figure 7 and the Town's engineering documents or standards.

The following section is a general description of the development staging plan. This staging plan is illustrated in Figure 12 while details of the utility staging are contained within the Master Servicing Plan from Martin Geomatics Consulting Ltd. found in Appendix 2. Changes made to the Master Servicing Plan may only take place with the Town's approval.

Cottonwood Estates will be staged in a series of subdivisions in response to market conditions. Since build-out is expected to take several years, the timing and phasing of development will be very important so as to be as economical as possible.

Development is intended to commence in the vicinity of the northwest corner of the development area. This is the most cost effective commencement point since both water and sewer line extensions would be the shortest distance from existing connection points. Extending a roadway from Fairway Drive would also be the shortest distance of any of the other possible roadway extensions. This extension will involve some land acquisition to ensure an appropriate alignment and connection point.

Beginning development at a northwest location also provides a variety of optional types of lots that could initially be brought on-stream. The land use concept indicates that ***"large lots"*** would be offered on the northeast side of the entrance road while an "***upscale adult villa site***" is possible on the southwest side.

South of the possible upscale adult villa site is a stretch of ***"estate lots"***. In response to market demand, large lot development could continue in an easterly direction while estate lot development could continue in a southerly direction. A potential lot layout scheme is illustrated in Appendix 6.

"Enhanced setback" lots could be made available within the first stage of development if desirable. ***"Standard lots"*** could start with the development of a cul-de-sac behind the enhanced setback lots. Across the street to the east of the stretch of estate lots would be another stretch of ***"enhanced setback lots"***. These enhanced setback lots would provide a transition between the very large estate lots to the west and the smaller, ***"standard lots"*** to the east.

This potential first stage of development could also provide a multi-unit residential site at an appropriate location. Park space would also be included within this development stage as indicated on the land use concept.

Generally the phasing plan is described as follows:

- Phase 1 of the plan would include all the land above the 867.3 meter contour.
- Phase 2 would include the remainder of the land within the plan area.
- Development will be staged in logical, market-oriented clusters.
- Each stage will be numbered but may not necessarily be developed in consecutive order.

Phases and stages are be indicated on Figure 12 .Future stages would be anticipated to continue in easterly and southerly directions as warranted by market conditions. The staging map, illustrates potential development stages.

f) Sustainable Community Development

Cottonwood Estates Area Structure Plan has attempted to take a more holistic approach to neighbourhood planning by incorporating features that address sustainability. Responsibility for a "sustainable approach" to community development is shared among various levels of government, community planners, land developers, property owners and the general public. According to Steven Peck and Guy Dauncey, two sustainable community consultants who conducted research for Canada Mortgage and Housing, there is an increasing recognition that the manner in which land is developed and redeveloped is a key determinant in the social and environmental health and economic well being of Canadians[2]. Peck and Dauncey have identified three major levels at which actions in support of sustainable community development or barriers to implementation occur:

- the planning and infrastructure level;
- the development site level; and
- the building level

Peck and Dauncey have identified 12 features of community sustainability which are incorporated within these three major levels. While not all of these features are represented, several aspects of Cottonwood Estates have integrated sustainability features, In particular, the following:

- ecological protection
  - recognition of adjacent wetlands in the SMRID right-of-way
  - significant trees have been incorporated into area of open space wherever possible
  - staging of development to preserve the use for agricultural purposes for as long as possible

2 REFERENCE: New Urban Agenda - 12 Features of Sustainable Community Development: Social, Economic and Environmental Benefits; Steven Peck, Peck & Associates & Guy Dauncey, Sustainable Communities Consultancy

- most lots may be larger than the norm thus enabling owners to plant gardens if they so wish

- Urban design
  - Cottonwood Estates provides a well designed, spacious living environment adjacent to actively farmed land
  - Although the site is basically flat, views will be afforded to a high percentage of lots adjacent to open spaces

- sustainable transport
  - walkway routes that connect to adjoining neighbourhoods and major non-residential land uses have been planned throughout the development area

- affordable housing
  - Cottonwood Estates will contain a range of housing types, lot sizes and prices
  - Medium-density residential sites are close to walkways and within walking distance of the school site and open space sites

- livable community
  - the developer will place gateway features at major entrances to the neighbourhood
  - architectural controls will be employed
  - traffic calming with curved streets and cul-de-sacs
  - there is an over dedication of municipal reserve
  - storm water management facilities have been designed to integrate with open space system
  - a school site has been provided

- sewage and storm water management
  - multi-purpose storm water management facilities are an integral component of the neighbourhood design

- water conservation
  - use of irrigation water for domestic watering purposes has been incorporated where possible thus avoiding use of treated water

- energy conservation
  - strong east-west road alignment in several locations throughout the neighbourhood to maximize solar access opportunities
  - curvilinear collector streets to minimize effects of strong winds
  - energy efficient designs will be encouraged in the architectural control of the development

g) Architectural Control

Architectural controls that are intended to provide a set of rules to ensure a reasonably high quality development will be utilized in the Cottonwood Estates development area and to ensure an appropriate level of housing design compatibility. Architectural controls may vary to some extent depending on the location within the development area and will be registered on lot land titles by the developer. Architectural control will be administered by the developer or his designate.

Typically the controls that will be in effect within Cottonwood Estates include the following:

- minimum dwelling unit area and site coverage (building footprint)
- diversity in home design
- incorporation of energy efficiency features
- roof pitch & materials
- exterior finishing materials
- fencing materials
- minimum landscaping requirements

The developer may undertake construction of certain stretches of fencing or installation of certain aspects of landscaping to establish the character of the development.

h) Community Mailbox Locations

Community mailboxes will be distributed throughout the development area as required by and in consultation with Canada Post.

i) Alignment With Municipal Development Plan

The following table indicates how the Cottonwood Estates Area Structure Plan complies with the policies of the Town of Coaldale Municipal development Plan.

Policy	Area of Compliance
3.1	• area structure plan prepared prior to land use reclassification from Urban Reserve
3.2	ASP has considered: • ease of servicing • storm water management • provision of alternate types of housing • linkage of open spaces • transportation patterns • compatibility with existing land uses
3.3	• ASP will be circulated to concerned agencies and the County of Lethbridge
3.4	• All mandatory setbacks will be observed
3.9	• senior's housing close to potential commercial and public use sites
3.11	• site is a designated growth area as identified by the Town
3.13	• commercial site requested by Town intended for neighbourhood level service
3.17	• architectural control will be utilized
3.24	• ASP adhering to recommendations from MPE storm water management study
3.27	• High design standards will be used for landscaping, entrance features created

	for subdivision gateways
3.30	• Care has been taken to minimize difficult to maintain park areas
3.30	• Park linkages have been provided
3.32	• Storm water management facilities integrated with parkways/pathways
3.38	• Developer has shown willingness to cooperate with Town and school district to provide school reserve

i) Consultation Process

i) Open House

An open house was held at the Land O'Lakes Golf Course Club house on the evening of May 18, 2005. As part of an ongoing planning process, this open house was an opportunity for Mr. Frache to seek input from interested and concerned citizens on the plan. Invitations were mailed to approximately 80 adjacent landowners, the Town Council, the Town administration, adjacent County landowners, the County of Lethbridge, the Regional Police Service and the Oldman River Regional Services Commission. An advertisement was also placed in the Sunny South News to notify the general public of the event.

The Open House was an informal come-and-go event and no formal presentations were be made. Staffs from Plains West Planning Services, Martin Geomatics Consulting Limited and the owner were on hand to explain features of the plan and answer questions that arose. Several Town Councilors and ORRSC staff were also on hand to field questions regarding process issues and other Town matters. The Open House featured display panels depicting:

- current conditions of the property;
- the purpose, goal, objectives and planning context for the plan area;
- the land use concept and proposed infrastructure systems;
- features to promote sustainability;

While 75 guests signed-in, it was estimated that at least 100 people dropped-in to review the plans. Although only 2 people actually provided written comments, the overall impression of he plan was positive.

ii) Town Administration, Planning and Engineering Advisors

Several meetings were held with Town of Coaldale administration together with staff from the Oldman River Regional Service Commission, the Town's planning advisors and staff from M.P.E. Engineering, the Town's engineering consultants. These meetings were productive and greatly enhanced the context and content of the p area structure plan.

iii) St. Mary's River Irrigation District

The consultants and Mr. Frache had several meetings and conversations with staff of the S.M.R.I.D. to resolve issues arising from the complexity of the irrigation system.

iv) Alberta Transportation and Utilities

Consulting staff met with Alberta Transportation and Utilities staff to ascertain transportation issues and requirements from the provincial perspective which have been incorporated into the plan.

v) Land O'Lakes Golf Course Management

Mr. Frache met with representatives of Land O'Lakes to resolve boundary issues that arose during the plan preparation.

APPENDICES

1. Land Ownership Information
2. Master Servicing Plan
3. Potential Land Use Classifications
4. Gateway Design Alternatives
5. Street Cross Sections
6. Potential Lot Layout

Appendix 1

Land Ownership Information

ALBERTA REGISTRIES

LAND TITLE CERTIFICATE

S

LINC	SHORT LEGAL	TITLE NUMBER
0013 976 279	4;20;9;10;SE	041 346 715

LEGAL DESCRIPTION

THE SOUTH EAST QUARTER OF SECTION TEN (10)
IN TOWNSHIP NINE (9)
RANGE TWENTY (20)
WEST OF THE FOURTH MERIDIAN
CONTAINING 64.7 HECTARES (160 ACRES) MORE OR LESS
EXCEPTING THEREOUT

(A) PLAN	NUMBER	HECTARES	(ACRES)
CANAL RIGHT OF WAY	IRR. 56	2.39	(5.9)
ROAD WIDENING	6LK	0.502	(1.24)

(B) ALL THAT PORTION OF THE SAID SOUTH EAST QUARTER, WHICH
LIES TO THE NORTH AND WEST OF THE NORTH WEST LIMIT OF
PLAN IRR. 56
CONTAINING 0.86 HECTARE (2.1 ACRES) MORE OR LESS
EXCEPTING THEREOUT ALL MINES AND MINERALS
AND THE RIGHT TO WORK THE SAME

ESTATE: FEE SIMPLE

MUNICIPALITY: TOWN OF COALDALE

REFERENCE NUMBER: 981 249 642

REGISTERED OWNER(S)

REGISTRATION	DATE(DMY)	DOCUMENT TYPE	VALUE	CONSIDERATION
041 346 715	13/09/2004	TRANSFER OF LAND	$1,125,000	$825,000

OWNERS

324700 ALBERTA LTD..
OF BOX 426
COALDALE
ALBERTA T1M 1N1
(DATA UPDATED BY: 041369478)

(CONTINUED)

ENCUMBRANCES, LIENS & INTERESTS

PAGE 2
041 346 715

REGISTRATION NUMBER	DATE (D/M/Y)	PARTICULARS
1485KX .	21/06/1971	IRRIGATION ORDER/NOTICE THIS PROPERTY IS INCLUDED IN THE ST. MARY RIVER IRRIGATION DISTRICT
861 148 653	10/09/1986	UTILITY RIGHT OF WAY GRANTEE - THE TOWN OF COALDALE. AS TO PORTION OR PLAN:8510909 "TAKES PRIORITY OF CAVE NO. 861116456, REGISTERED 18 07 1986"
891 127 789	06/07/1989	UTILITY RIGHT OF WAY GRANTEE - CANADIAN WESTERN NATURAL GAS COMPANY LIMITED.
011 042 181	13/02/2001	UTILITY RIGHT OF WAY GRANTEE - THE COUNTY OF LETHBRIDGE NO. 26.

TOTAL INSTRUMENTS: 004

THE REGISTRAR OF TITLES CERTIFIES THIS TO BE AN ACCURATE
REPRODUCTION OF THE CERTIFICATE OF TITLE REPRESENTED
HEREIN THIS 3 DAY OF JUNE, 2005 AT 10:11 A.M.

ORDER NUMBER:2850565

CUSTOMER FILE NUMBER: 7072

END OF CERTIFICATE

Appendix 2

Master Servicing Plan

Part 1

Drainage and Stormwater Management Concept

The following outlines the concept for drainage and stormwater management for the development of the Southeast Quarter of Section 10, Township 9, Range 20 West of the 4th Meridian (the "Subject Area").

1. Existing Conditions

Presently, drainage across the subject area is overland, roughly from the west to a 900-mm diameter culvert under Highway 845. This culvert discharges into an open channel known as the South Coaldale Drain. According to the *South Coaldale Stormwater Management Plan* (MPE Engineering Ltd., November 2002), the subject area ("Area 2" in the MPE Report) also receives drainage from Section 3-10-9-4 (the square-mile immediately south, "Area 1" in the MPE Report) which is outside the Town Limits in the County of Lethbridge. Contributing areas and present land uses noted in the MPE Report are a follows:

Catchment Areas and Predicted Runoff Volumes (per MPE, p. 14)

Area Number	Gross Area (ha)	Land use	Peak flow predicted in 100-year event (m^3/s)	Runoff volume predicted in 100-year event (m^3)
1	276	Agriculture	4.24	122,000
2	66	Agriculture	2.34	29,200

Due to capacity limitations in the South Coaldale Drain and the culvert under Highway 845, localized flooding occurs in the subject area during storm events (MPE, p. 9).

To account for existing runoff from Area 1 and development in the subject area and the limited capacity of the South Coaldale Drain, it is estimated (MPE, p. 19) that 124,500 m^3 of detention storage is required. Therefore, development of the east part of the subject area (below the 867.3-m contour) will be deferred until such time as flows from Area 1 area controlled such that ponding in the subject area is not necessary to prevent surcharge in the culvert under Highway 845. **Figure No. 5** shows the extent of the ponding necessary to obtain 124,500 m^3 of detention storage given the initial site grading. For interim development, it is assumed that the 900-mm diameter culvert under Highway 845 already provides adequate flow control to prevent flooding in the South Coaldale Drain.

Given that an urban cross-section is proposed for the streets, runoff will be drained using a conventional dual-drainage (major/minor) storm sewer system. Street and lot drainage (with the exception of foundation weeping tile, see below) will initially be directed to street gutters. Catch basins will be placed at strategic positions to intercept these gutter flows and direct them to the storm sewers. These storm sewers (referred to as the "minor" system) will drain, by gravity, to an outfall located as shown on **Figure No. 11**.

The minor system will be designed to discharge the peak flow estimated for a design storm with a 5-year return period given full development without surcharge in the pipes. Runoff in excess of this volume will be directed via road gutters and grass swales (referred to as the "major" system) to discharge at a similar location to the storm sewers. The major system will be designed such that peak runoff from a full design storm with a 100-year return period can be discharged without flow depths and velocities exceeding those noted Table 3-1 of *Stormwater Management Guidelines for the Province of Alberta* (Alberta Environment, January 1999).

As the ponding onsite will likely induce surcharge in the proposed minor system, analysis of the hydraulic grade line (HGL) in these pipes will be conducted as part of the overall subdivision design. To protect buildings from flooding due to water backing up in the storm sewers and flooding the foundation weeping tile, it is assumed that the lowest top of footing (LTF) elevation of all houses will be at least 0.3 m higher than the HGL in the adjacent storm sewer.

At such time as runoff from offsite (i.e. Area 1) has been controlled to such a rate and quantity that backup of stormwater upstream of the Highway 845 culvert is not a concern, the east part of the site can be developed.

Again a dual-drainage storm sewer design will be employed, similar to the system specified above. To control runoff from the development, stormwater detention ponds are envisioned at locations shown on **Figure No. 11**. These ponds will have active storage capacities such that all on-site runoff resulting from a design storm with a 100-year return period for the fully-developed site can be detained. Once the storm event has passed and the level water in the South Coaldale Drain allows it, a storm water pumping station will draw down the pond at such a rate that the canal does not overflow and downstream residents and landowners are not adversely affected.

Part 2
Sanitary Servicing Concept

The following details the conceptual design for conveying wastewater from the proposed development.

1. Existing Sanitary Sewers

Presently, a Town gravity sanitary sewer crosses the subject area from west to east. The sewer is located approximately 400 m north of the south section line. It consists of a 250-mm diameter pipe with a continuous slope from west to east of 0.36%. Assuming a smooth-wall concrete or PVC pipe, flowing full, the sewer could discharge wastewater at a maximum rate of 36 L/s. This sewer presently serves 100 homes in the subdivision located to the west of the subject area. Assuming three (3) people per home and a daily wastewater flow of 450 L/person/day, the expected daily flow through the sewer is 135,000 L/day. Using a peak factor of 3.0, the design peak flow in the sewer is estimated at 4.7 L/s.

2. Future Servicing

Using a value of 30 people per hectare of the subject area generating 450 L/person/day the expected average daily flow from the 66-ha subject area is 891,000 L/day. A peaking factor of 3.0 would gives a design peak flow estimation of 31 L/s. Total daily flow is estimated at 1,026,000 L/day. This gives a peak flow of 35.6 L/s. Given a full-flow capacity of 36 L/s, the trunk sewer has adequate capacity. It is assumed that the Town of Coaldale's existing infrastructure has adequate capacity to accept the additional wastewater generated by this development.

Proposed sanitary sewers will be gravity sewers with a minimum diameter of 200 mm. All public mains will be PVC and will be designed with adequate slopes to ensure a minimum velocity of 0.7 m/s as specified in *Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems* (Alberta Environment, December 1997).

3. Conceptual Sanitary Servicing Plan

The conceptual sanitary servicing plan is shown on Figure No. 9.

Part 3

Water Supply and Distribution System Concept

The following details the conceptual design for the water supply and distribution system for the proposed new subdivision.

1. Existing Water Supply

Treated water is supplied by the Town of Coaldale. It is assumed that the Town's water infrastructure has adequate capacity to accommodate this development. Presently, water mains exist at the following locations:

a. A 300-mm diameter main runs from west to east across the site. From the west, the main enters the subject area at the southeast corner of the site and proceeds along the south section line. Approximately 400 m east, the line deflects north. At a point approximately 400 m north of the section line, this main deflects east, running to the east section line, where it passes under Highway 845.

b. A 200-mm diameter water main in Fairway Drive (at the northwest corner of the proposed development).

c. A 150-mm diameter water main from 24th Avenue from 24th Street to 21st Street.

d. A 150-mm diameter water main on the west side of Highway 845 (20 Street) which ends immediately north of the existing canal right-of-way.

Hydrants exist at the following locations:

a. 25th Avenue, immediately east of 24th Street/Fairway Drive,

b. Highway 845 (20th Street) immediately north of the existing irrigation canal right-of-way (25th Avenue),

c. 30th Avenue, 20 m east of Highway 845.

Alberta Environment states the following guideline for pressures in a water distribution system:

"[…] SHOULD BE DESIGNED TO HANDLE A NORMAL OPERATING PRESSURE

BETWEEN 350 kpa (51 psi) AND 550 kpa (80 psi) UNDER A CONDITION OF MAXIMUM HOURLY DESIGN FLOW."

Additionally, based on *Water Supply for Fire Protection* (Fire Underwriters Survey, 1990), the Town of Coaldale requires the following sustained pressures and flows be available for fire protection. For residential subdivisions, a flow of 3,400 L/min (900 USgpm) at a residual pressure of 138 kPa (20 psi) must be available at any given hydrant. From any three (3) adjacent hydrants, total flow must exceed 5,000 L/min (1,320 USgpm) at a residual pressure of 138 kPa (20 psi).

According to MPE Engineering Ltd., who administer the Town of Coaldale's water modeling system, there is adequate pressure and flow available for the existing adjacent developments. MPE assumed the following:

- a peak daily demand at each hydrant of 27.2 L/min (7.2 USgpm),
- rural water demands,
- McCain plant production requiring one (1) train per day (not accounting for future expansion).

No specific hydrant testing data was made available. However, it is assumed that the model used by the Town is properly calibrated and gives an accurate representation of the Town's existing water distribution system.

2. Proposed Water Supply and Distribution

To service the proposed development, it is proposed that new water mains tie to the Town of Coaldale's existing mains at the following points:

a. To the existing 200-mm diameter main in Fairway Drive, immediately northwest of the proposed development,

b. To the existing 300-mm diameter main, 400 m east of the west quarter line and 25 m north of the south section line (ties east and west),

c. At approximately three (3) points on the 300-mm diameter main east of Highway 845,

d. Extension of the existing 150-mm diameter main west of Highway 845 (20th Street) approximately 30 m south to tie to the development,

e. Extension of the main in 22nd Street approximately 30 m to the new development.

As part of the design process, the proposed water distribution system will be analyzed using an appropriate computer model. Peak daily demand assumed for the new development is 35 L/min (9 USgpm) at each hydrant. All mains will be sized to ensure adequate water supply for fire prevention and domestic use. As a minimum, the following sizes are assumed:

- All looped mains will be minimum 200-mm diameter, C900 PVC,
- All stubbed mains will be minimum 150-mm diameter, C900 PVC.

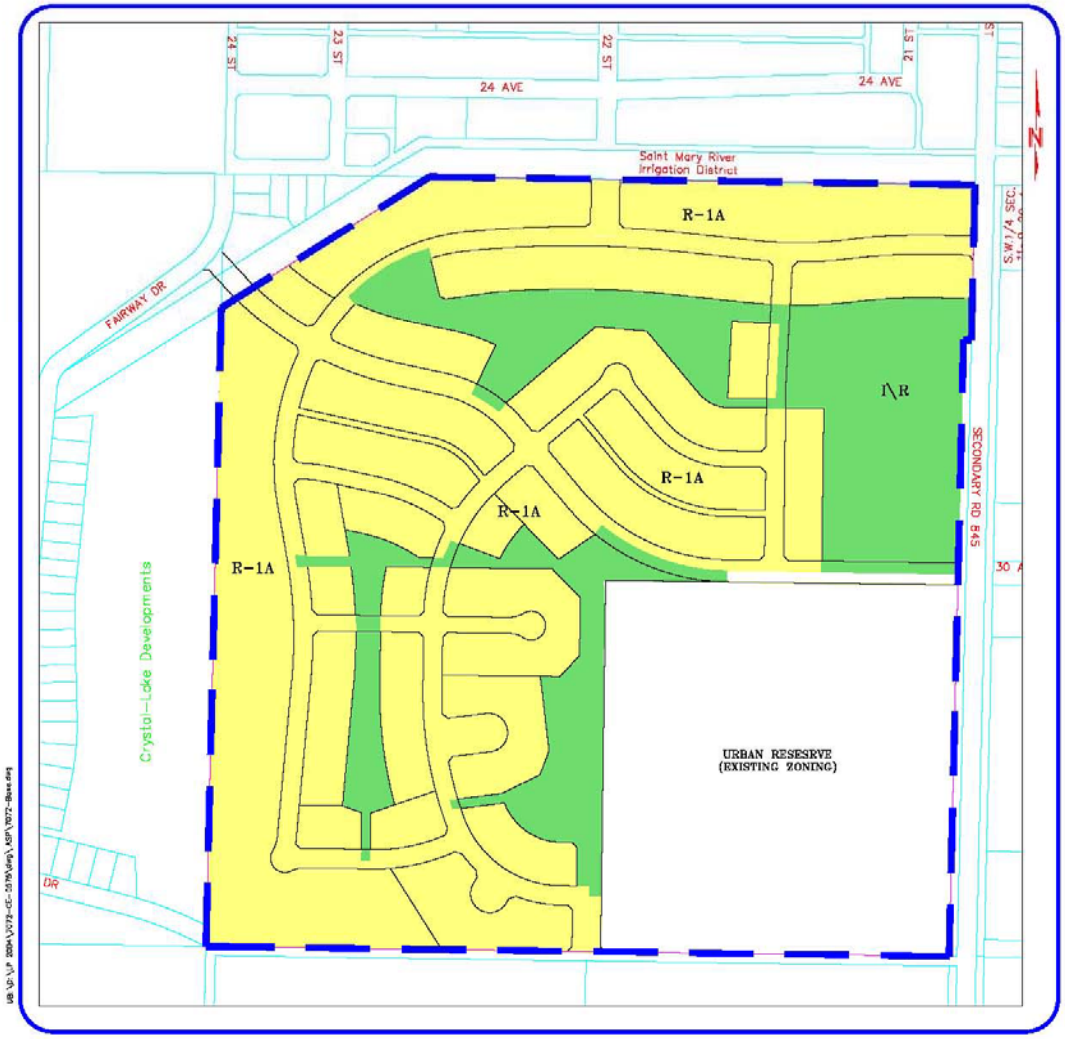
A preliminary analysis based on the above indicates that no reservoirs, booster pump stations or pressure-reducing valves are assumed required for this development.

3. Conceptual Water Servicing Plan

The conceptual water servicing plan is shown on **Figure No. 10.**

Appendix 3

Potential Land Use Classifications



COALDALE

COTTONWOOD ESTATES BOUNDARY

Residential R-1A

Institutional/Recreation I/R

Proposed Zoning
Portion SE.1\4
Sec.10-9-20-4

MARTIN GEOMATIC CONSULTANTS LTD
Consulting Engineers, Planners, and Land Surveyors

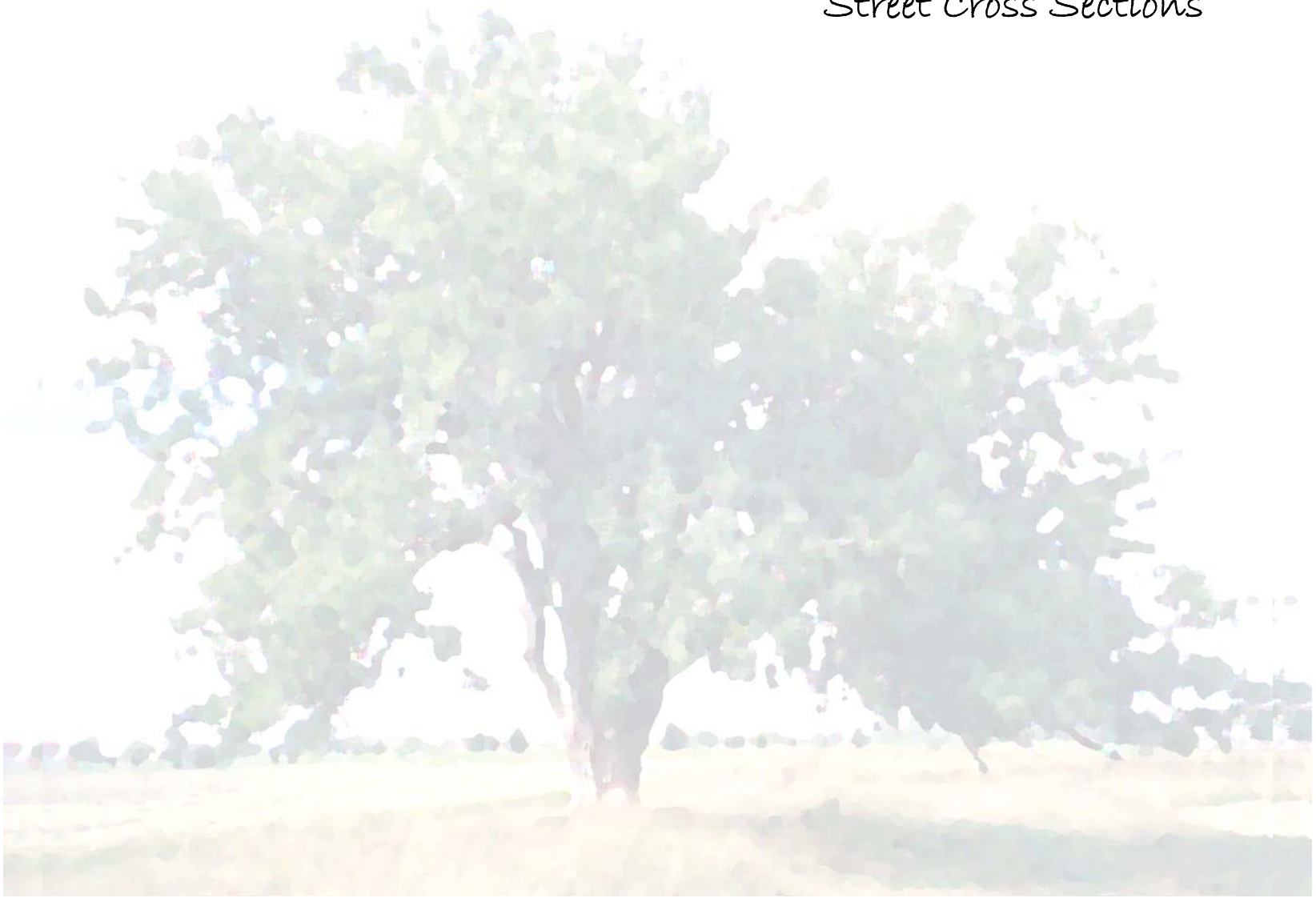
PLAINS WEST PLANNING SERVICES LTD

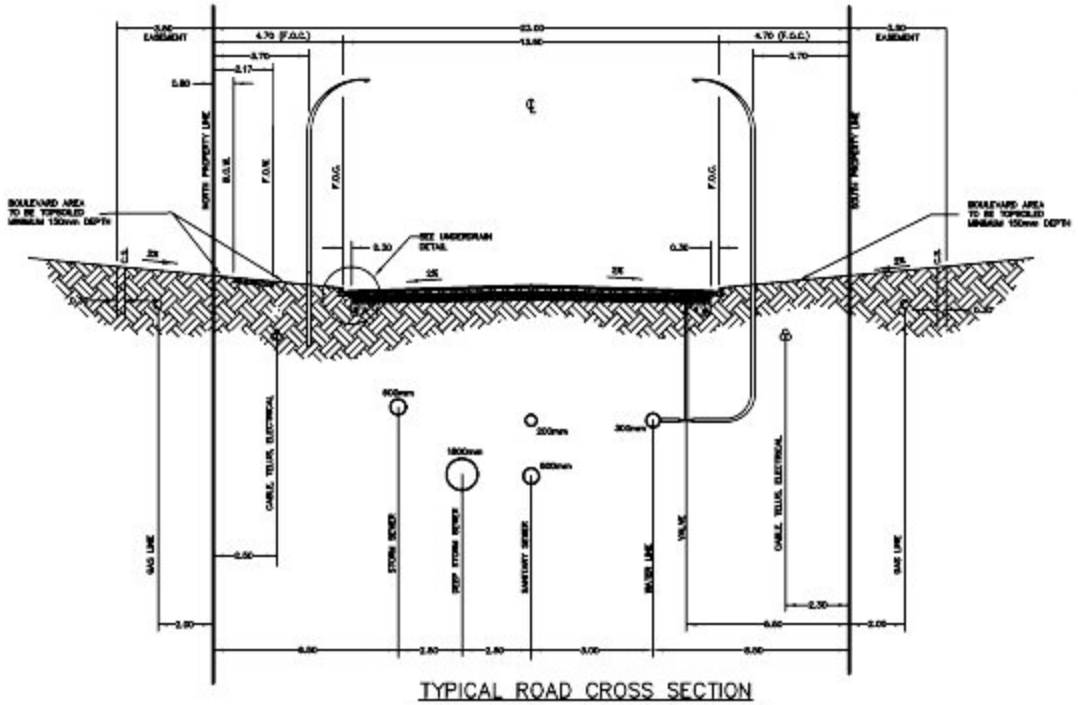
Appendix 4

Gateway Design Alternatives

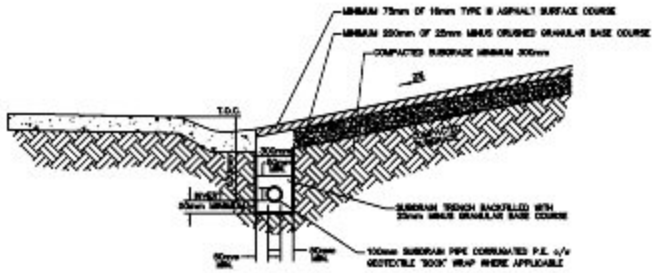
Appendix 5

Street Cross Sections





TYPICAL ROAD CROSS SECTION
23.0m R.O.W. MAJOR COLLECTOR



SUBDRAIN AND PAVEMENT DETAIL

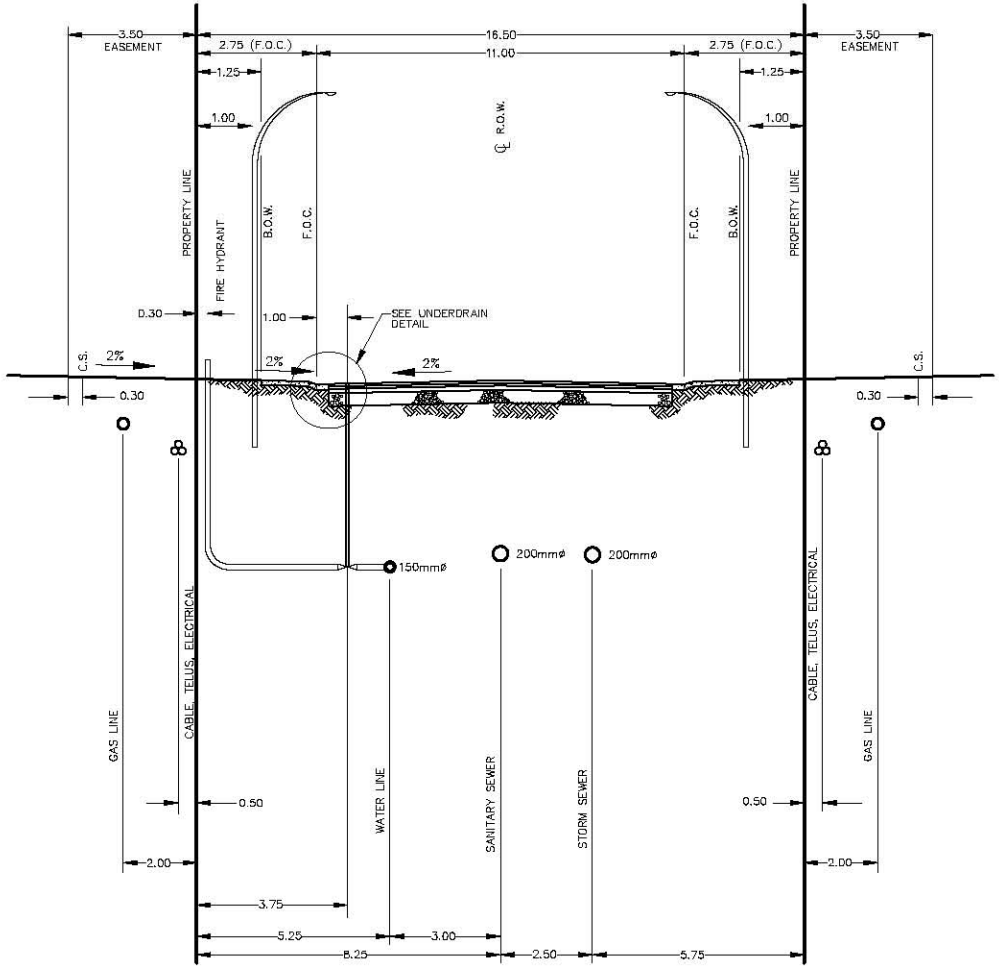
COALDALE

COTTONWOOD ESTATES BOUNDARY

23.0m R.O.W
MAJOR COLLECTOR
Not to scale Appendix 5A

MARTIN
Consulting Engineers, Planners, and Land Surveyors

PLAINS WEST
PLANNING SERVICES LTD



TYPICAL ROAD CROSS SECTION
16.50m R.O.W. LOCAL ROAD

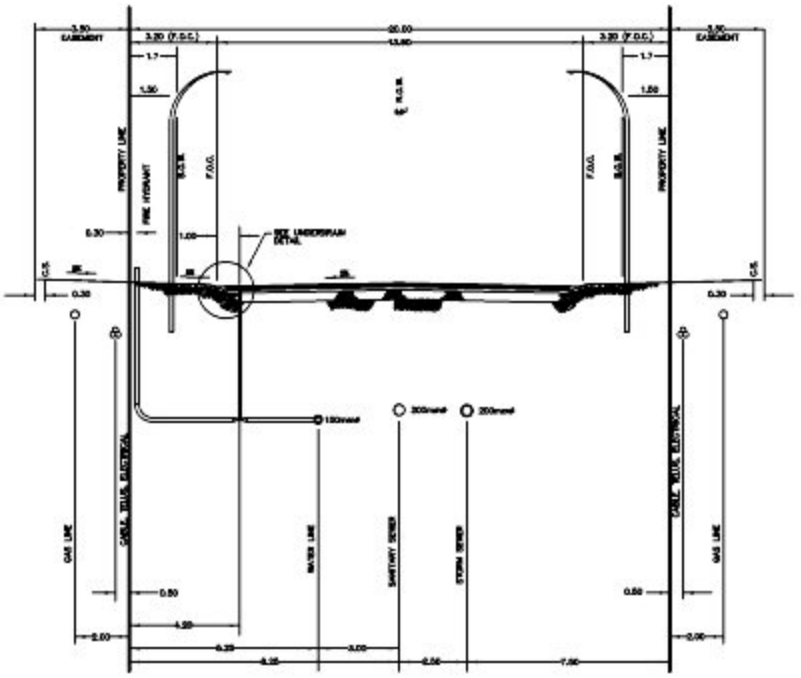
COALDALE

COTTONWOOD ESTATES
BOUNDARY

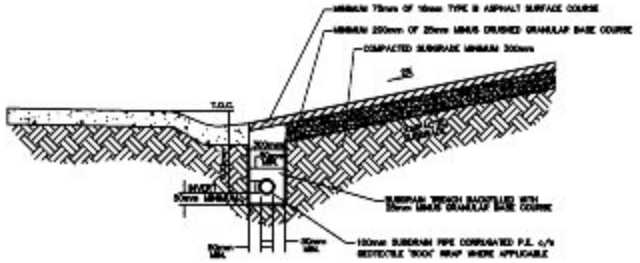
16.5m R.O.W
LOCAL ROAD
Not to scale Appendix 5c

MARTIN GEOMATIC CONSULTANTS LTD.
Consulting Engineers, Planners, and Land Surveyors

PLAINS WEST PLANNING SERVICES LTD



TYPICAL ROAD CROSS SECTION
20.0m R.O.W. MINOR COLLECTOR



SUBDRAIN AND PAVEMENT DETAIL

COALDALE

COTTONWOOD ESTATES
BOUNDARY

20.0m R.O.W
MINOR COLLECTOR
Not to scale Appendix 'B'

MARTIN
ENGINEERING CONSULTANTS LTD.
Consulting Engineers, Planners, and Land Surveyors

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Appendix 6

Potential Lot layout

COALDALE

COTTONWOOD ESTATES
BOUNDARY

Lot Layout

Scale 1:5000

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