

## PHASE ONE MAPS-BOW RIVER

## RIPARIAN AREAS MAPPING PROJECT FOR THE CITY OF CALGARY

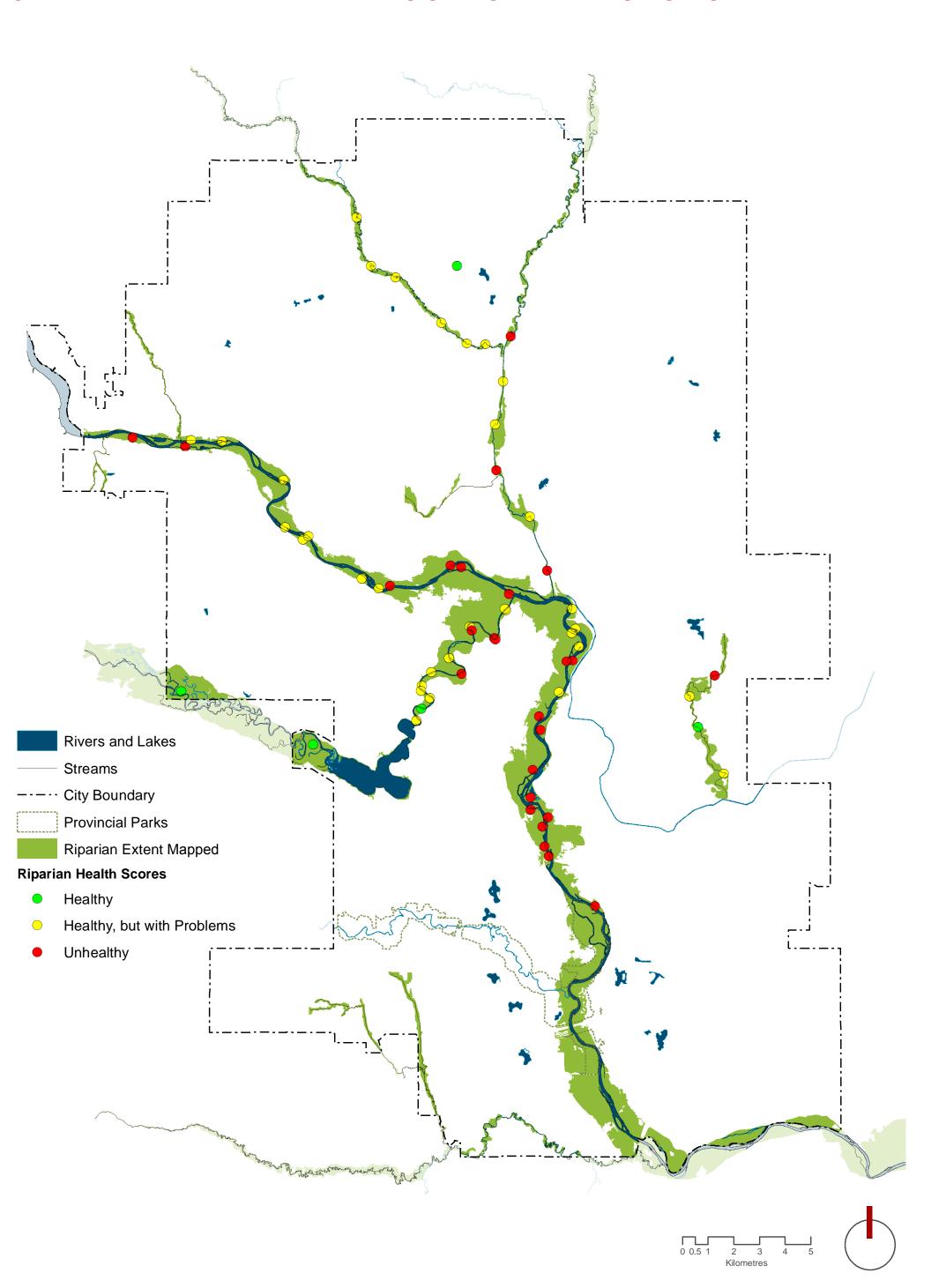
Prepared by: O2 Planning + Design Inc. with The Alberta Riparian Habitat Management Society (Cows and Fish)

Submitted to: The City of Calgary Water Resources

October 19 | 2012

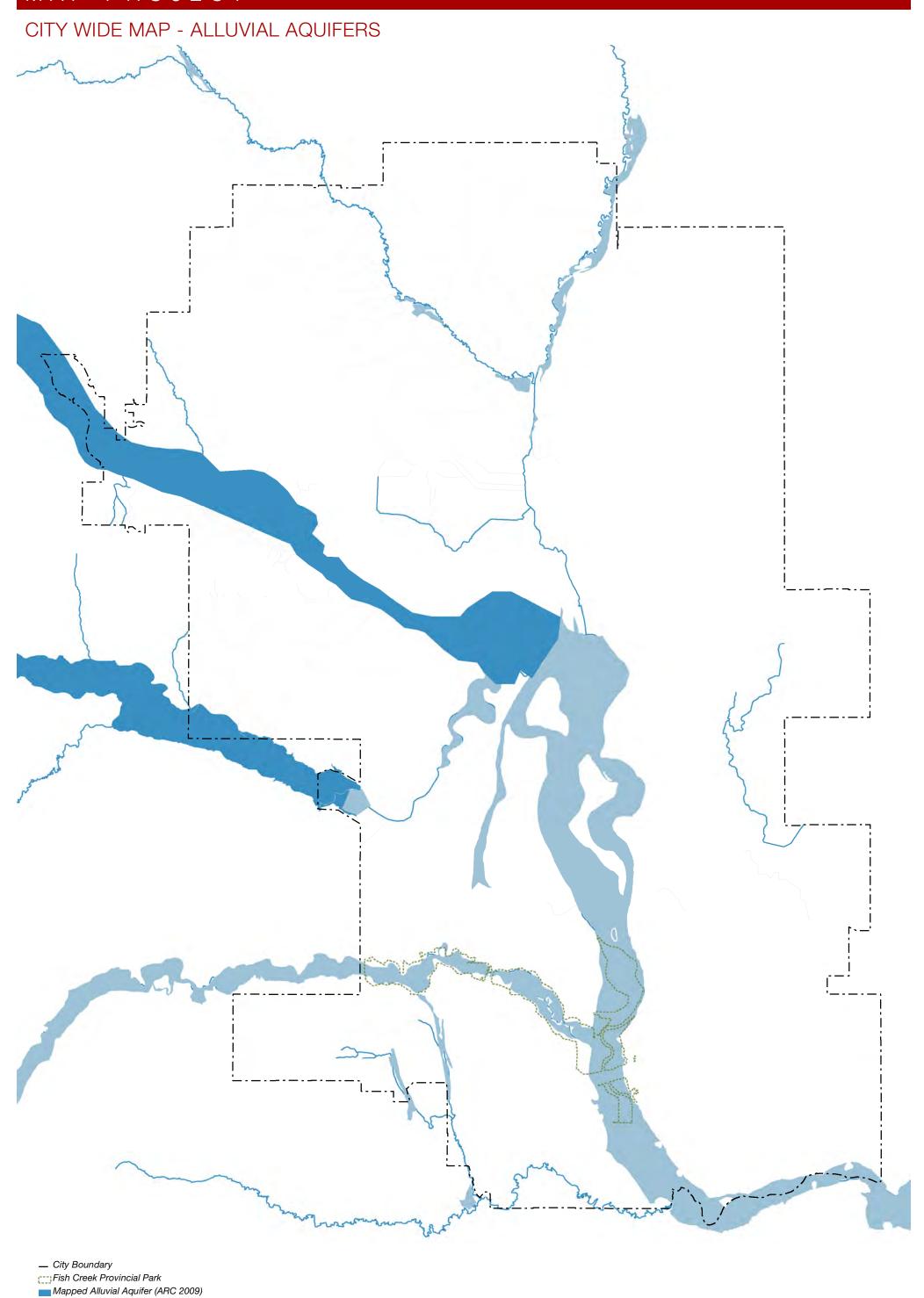


### CITY WIDE MAP - RIPARIAN LOCATION AND FUNCTION

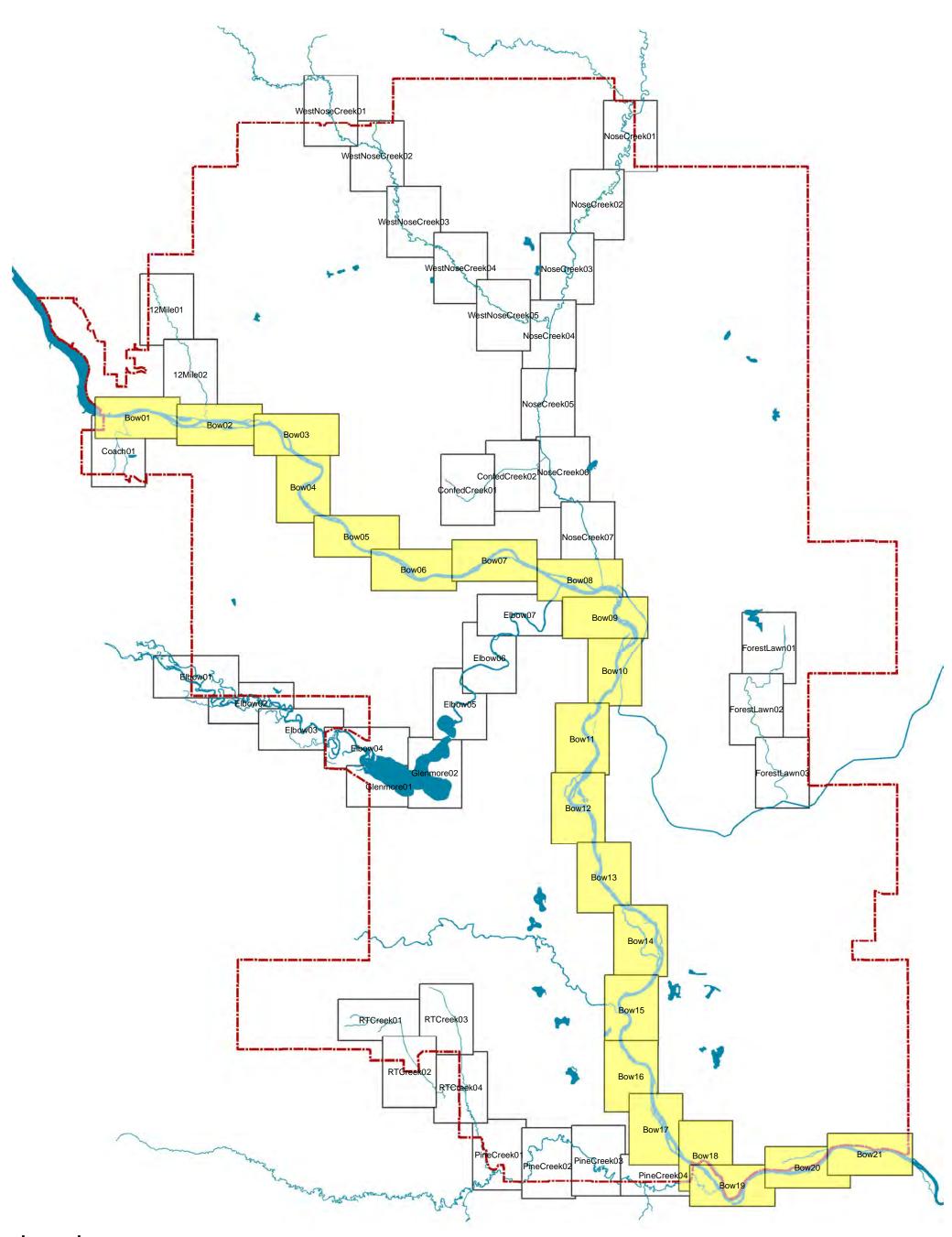


Potential Large Alluvial Aquifers in Coarse Sediments (Moran 1986)

\_\_\_Streams / Rivers \_\_Lower Order Streams



### CITY WIDE MAP - MAP BLOCK CODE



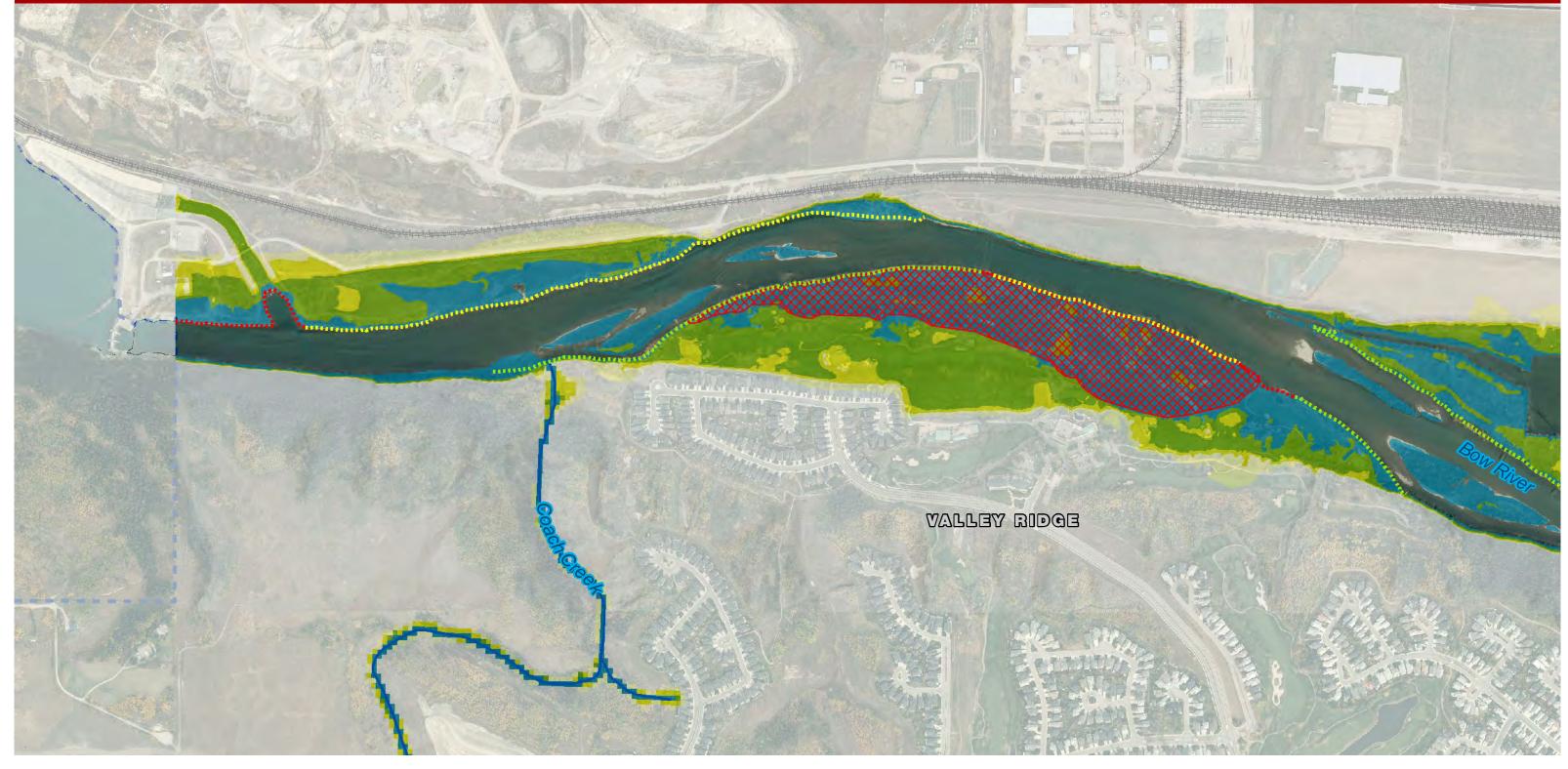
### Legend

Map Block Code ID

City of Calgary Boundary

Water Surface

# RIPARIAN AREA - LOCATION AND FUNCTION BOW RIVER 01



#### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

#### Riparian Health\*\*

Healthy ...

Healthy, but with Problems

Unhealthy

\*\*Based on field studies of sampled riparian polygons only

Jnhealthy

major rivers / creeks, excluc private residential riverfront or steep valley slopes with limited riparian habitat

Good

#### Bank Health\*\*\*

City BoundaryMajor Roads

Streams

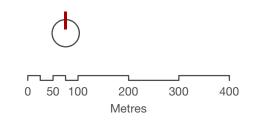
Moderate H++++ Rail

Poor

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots









Commercial

Industrial

Institutional

Future Urban Development

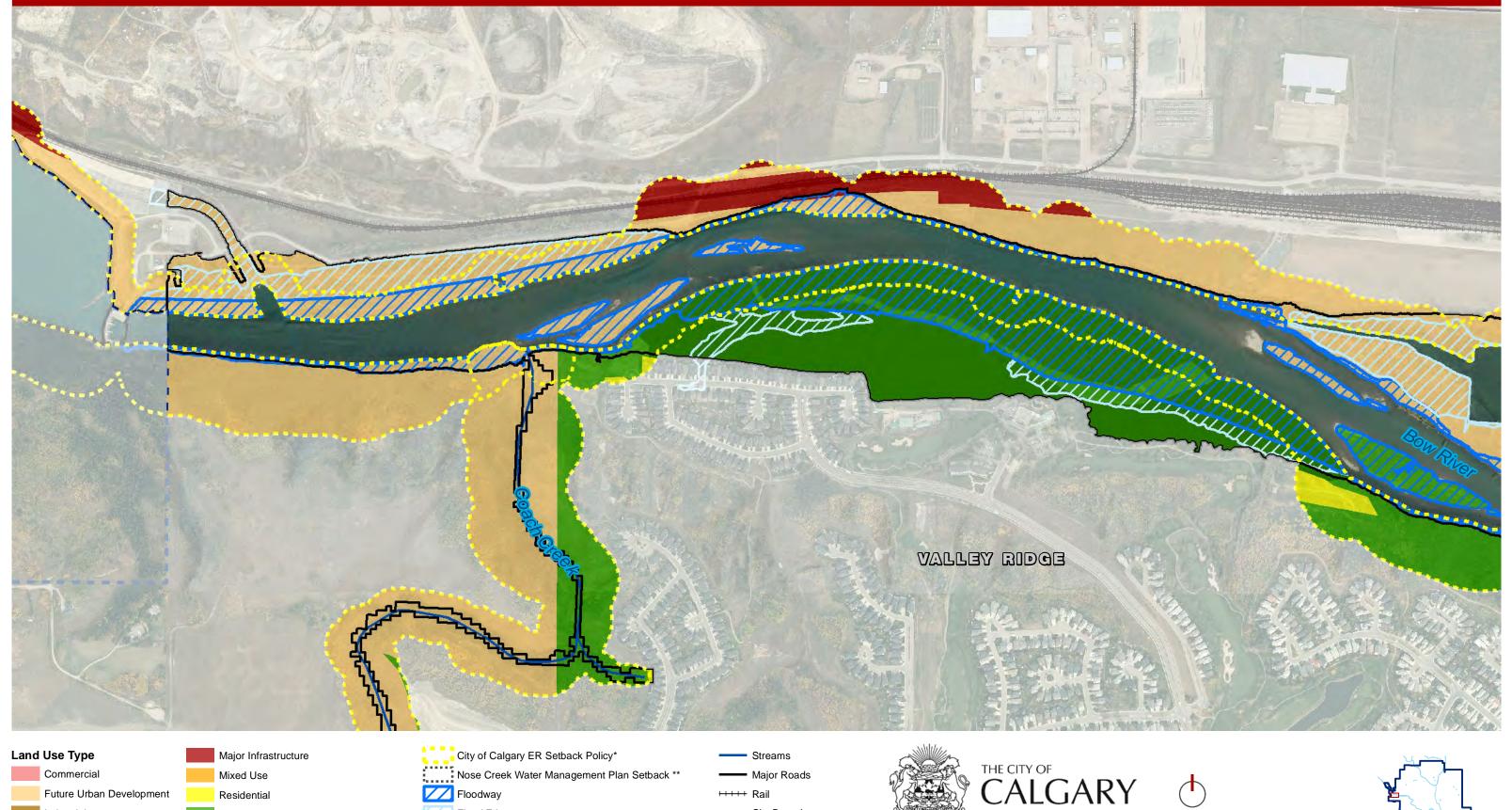
Mixed Use

Residential

Golf Course

Parks, Recreation and Public Education

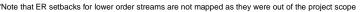
## LAND AND REGULATORY ISSUES **BOW RIVER 01**



Major Roads

City Boundary

<del>□ □ □</del> Rail



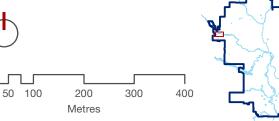
Outer Riparian Zone Boundary

Floodway

Flood Fringe

Flood Extent - 100 Year (Nose Creek/West Nose Creek) Fish Creek Provincial Park





<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

## EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS **BOW RIVER 01**



Stormwater Lift Station Storm Main (> 900mm diameter) Sanitary Main (>600mm diameter) Water Main (>400mm diameter) Pipeline River Crossing Locations Water / Waste Water Treatment Plants

Existing Storm Retrofit Pond

Gravel Trails ==== Bridge Buildings Parks (Maintained Turf Areas) Possible Location of Storm Retrofit Pond

△ Candidate Flood / Erosion Control Projects

■ ■ Bank Erosion Hotspot

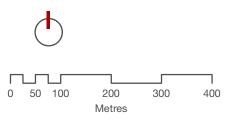
Paved Trails

---- Major Roads HH Rail Fish Creek Provincial Park The non-masked area is based on the greater of: (i) outer riparian zone of the variable width model,
 (ii) City ER setback policy boundary,
 (iii) Nose Creek Watershed Partnership
 recommended setback policy

(See Theme 2-Land and Regulatory Issues)

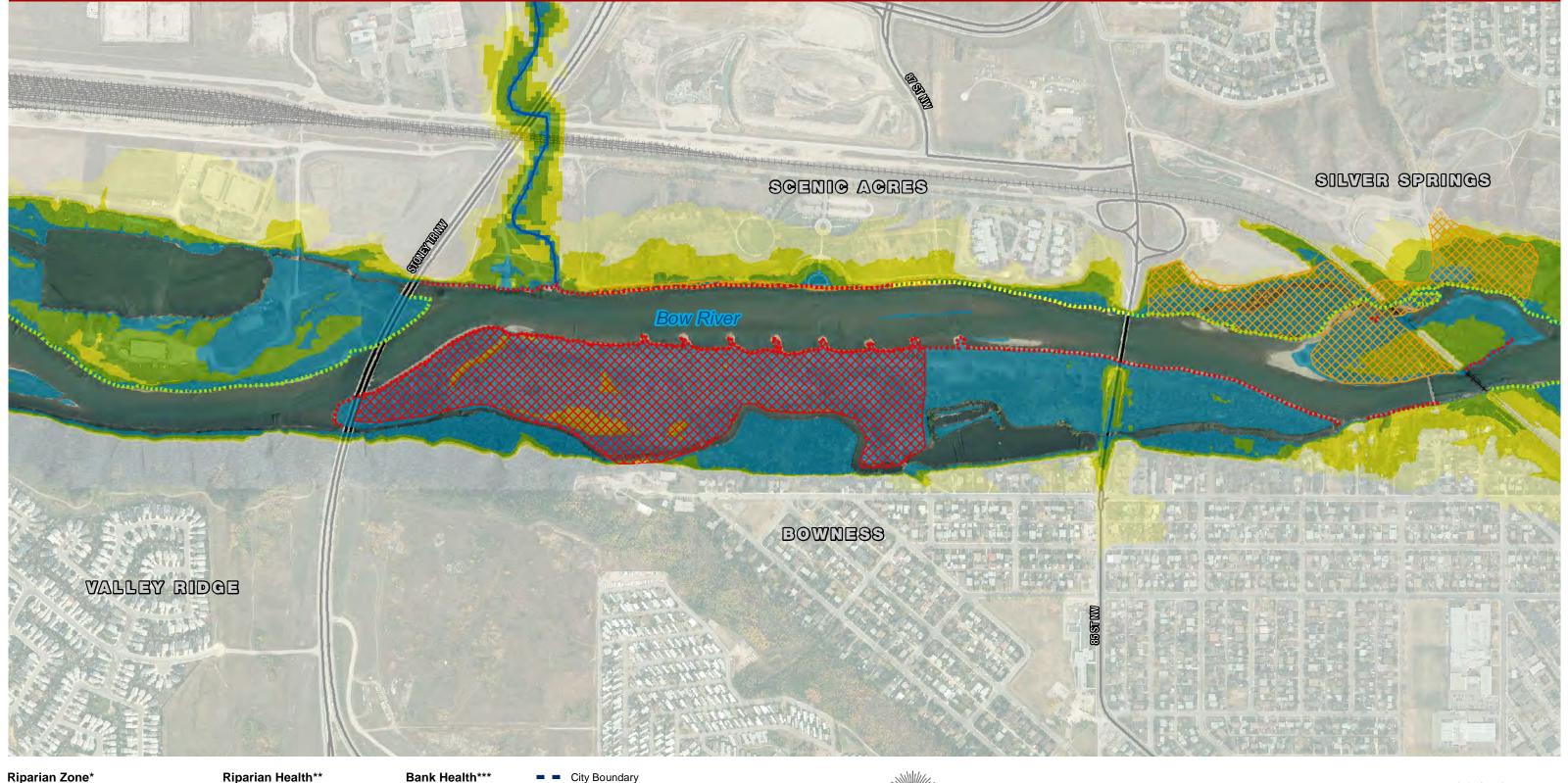








## RIPARIAN AREA - LOCATION AND FUNCTION BOW RIVER 02



#### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

\*\*Based on field studies of

sampled riparian polygons only

Healthy

Healthy, but with Problems

Unhealthy Unhealthy

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

#### Bank Health\*\*\*

City Boundary Major Roads

HHH Rail

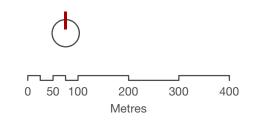
Good Moderate

Poor

Streams Fish Creek Provincial Park









Commercial

Industrial

Institutional

Future Urban Development

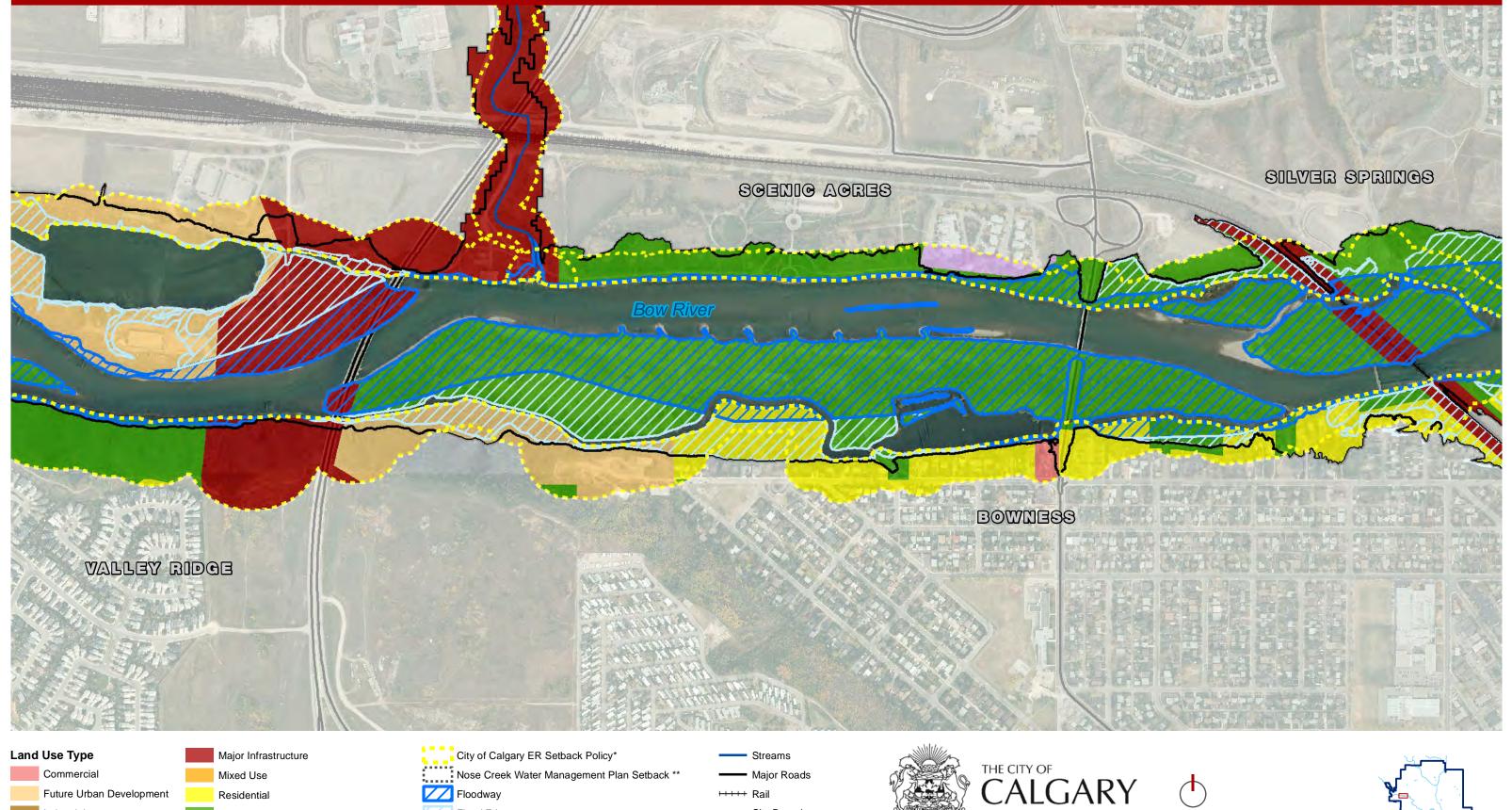
Mixed Use

Residential

Golf Course

Parks, Recreation and Public Education

## LAND AND REGULATORY ISSUES BOW RIVER 02



Major Roads

City Boundary

Fish Creek Provincial Park

HHH Rail



Outer Riparian Zone Boundary

Floodway

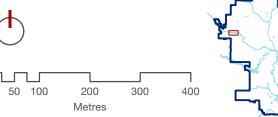
Flood Fringe

Nose Creek Water Management Plan Setback \*\*

Flood Extent - 100 Year (Nose Creek/West Nose Creek)

<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%





## EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS BOW RIVER 02



Stormwater Lift Station Storm Main (> 900mm diameter) Sanitary Main (>600mm diameter) Water Main (>400mm diameter) Pipeline River Crossing Locations Water / Waste Water Treatment Plants

Existing Storm Retrofit Pond

Paved Trails Gravel Trails ==== Bridge Buildings Parks (Maintained Turf Areas) Possible Location of Storm Retrofit Pond

△ Candidate Flood / Erosion Control Projects

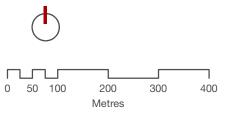
■ ■ Bank Erosion Hotspot

Major Roads HH Rail Fish Creek Provincial Park The non-masked area is based on the greater of: (i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership

(See Theme 2-Land and Regulatory Issues)

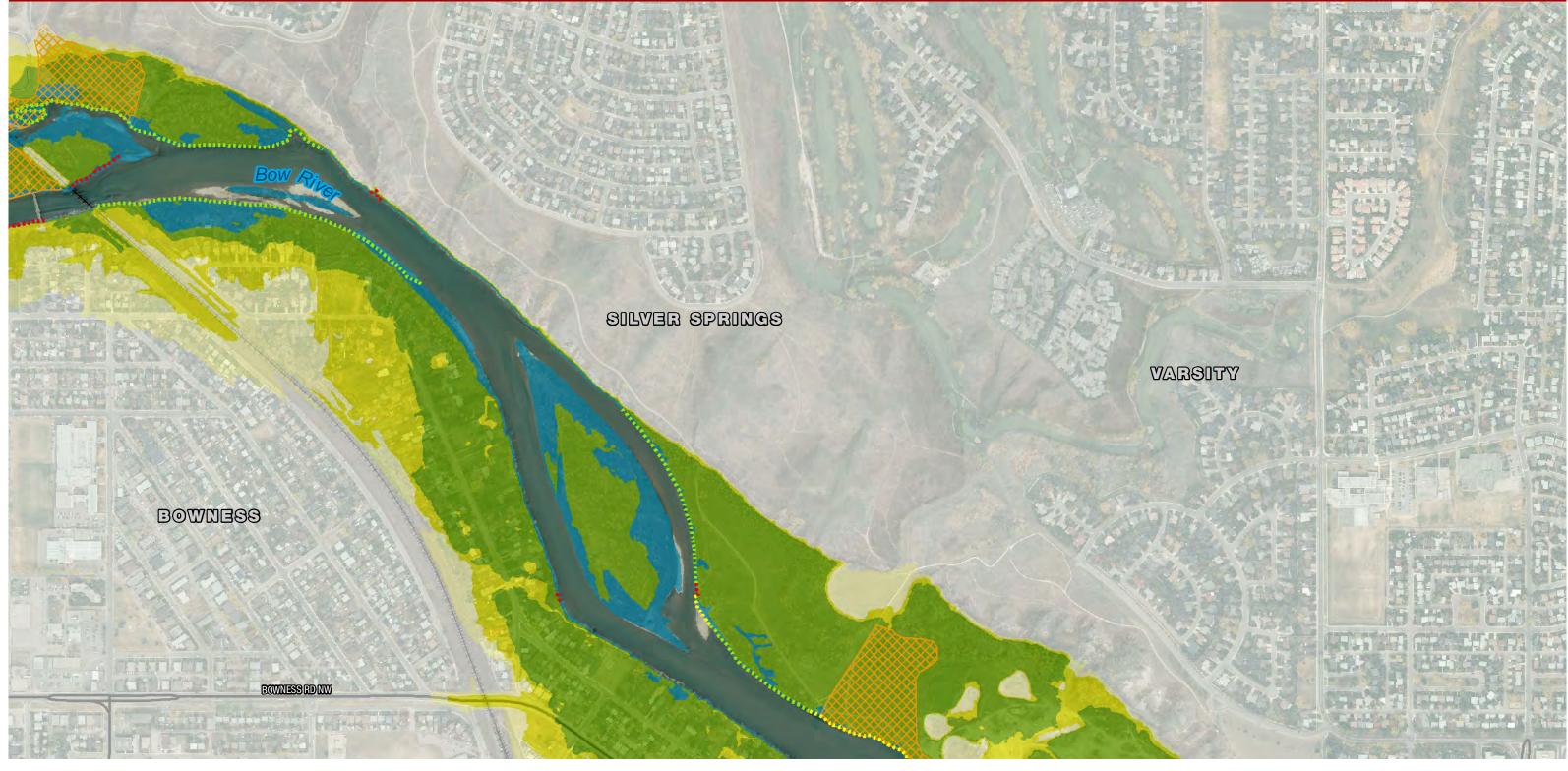








# RIPARIAN AREA - LOCATION AND FUNCTION BOW RIVER 03



#### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

#### Riparian Health\*\*

Healthy Healthy

Healthy, but with Problems

Unhealthy Unhealthy

\*\*Based on field studies of

sampled riparian polygons only

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

#### Bank Health\*\*\*

Good

Poor

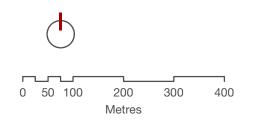
City BoundaryMajor Roads

Streams

Fish Creek Provincial Park





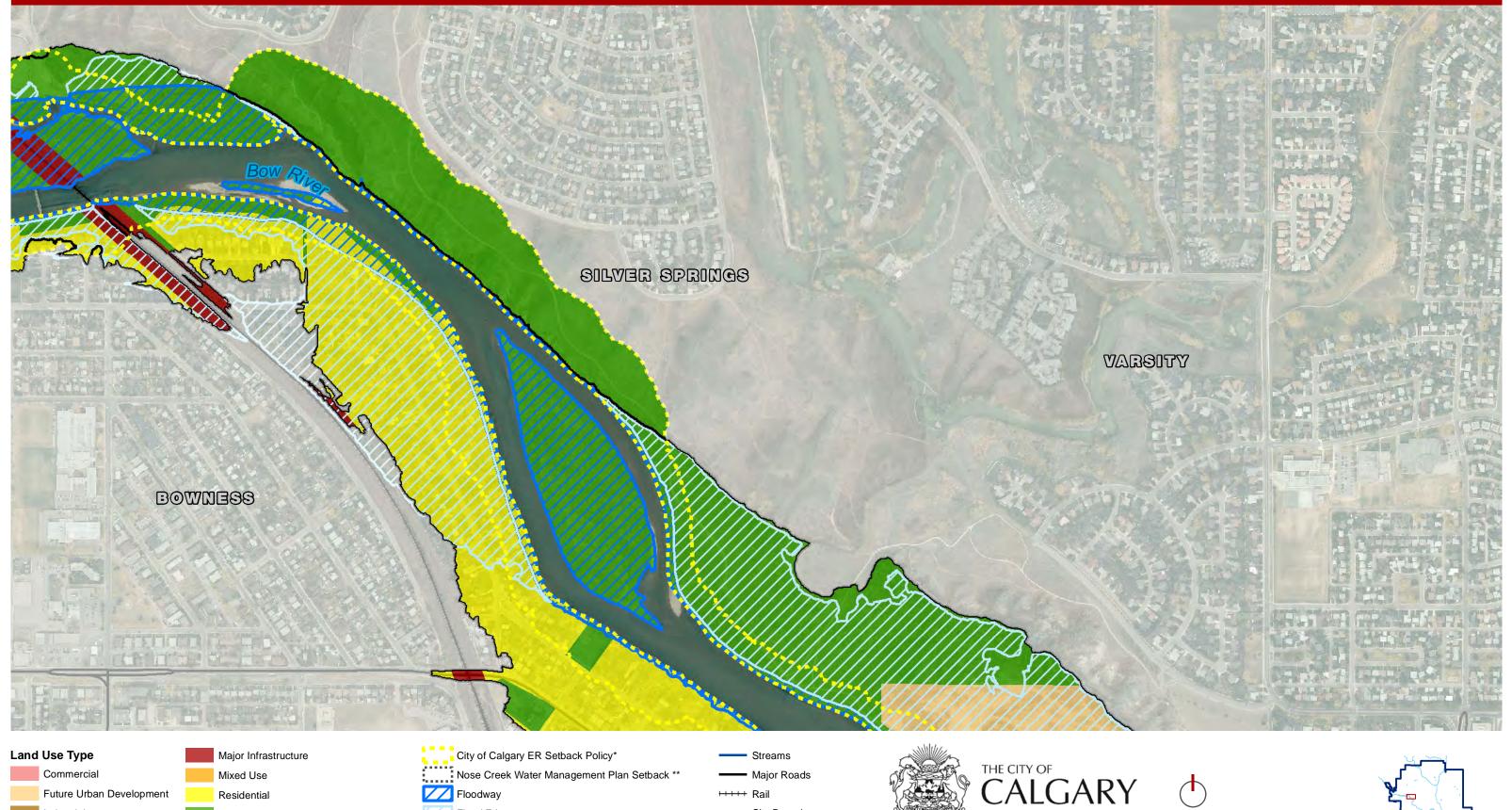




Industrial

Institutional

# LAND AND REGULATORY ISSUES BOW RIVER 03



City Boundary

Fish Creek Provincial Park

\*Note that ER setbacks for lower order streams are not mapped as they were out of the project scope

Outer Riparian Zone Boundary

Flood Extent - 100 Year (Nose Creek/West Nose Creek)

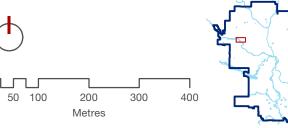
Flood Fringe

Parks, Recreation and Public Education

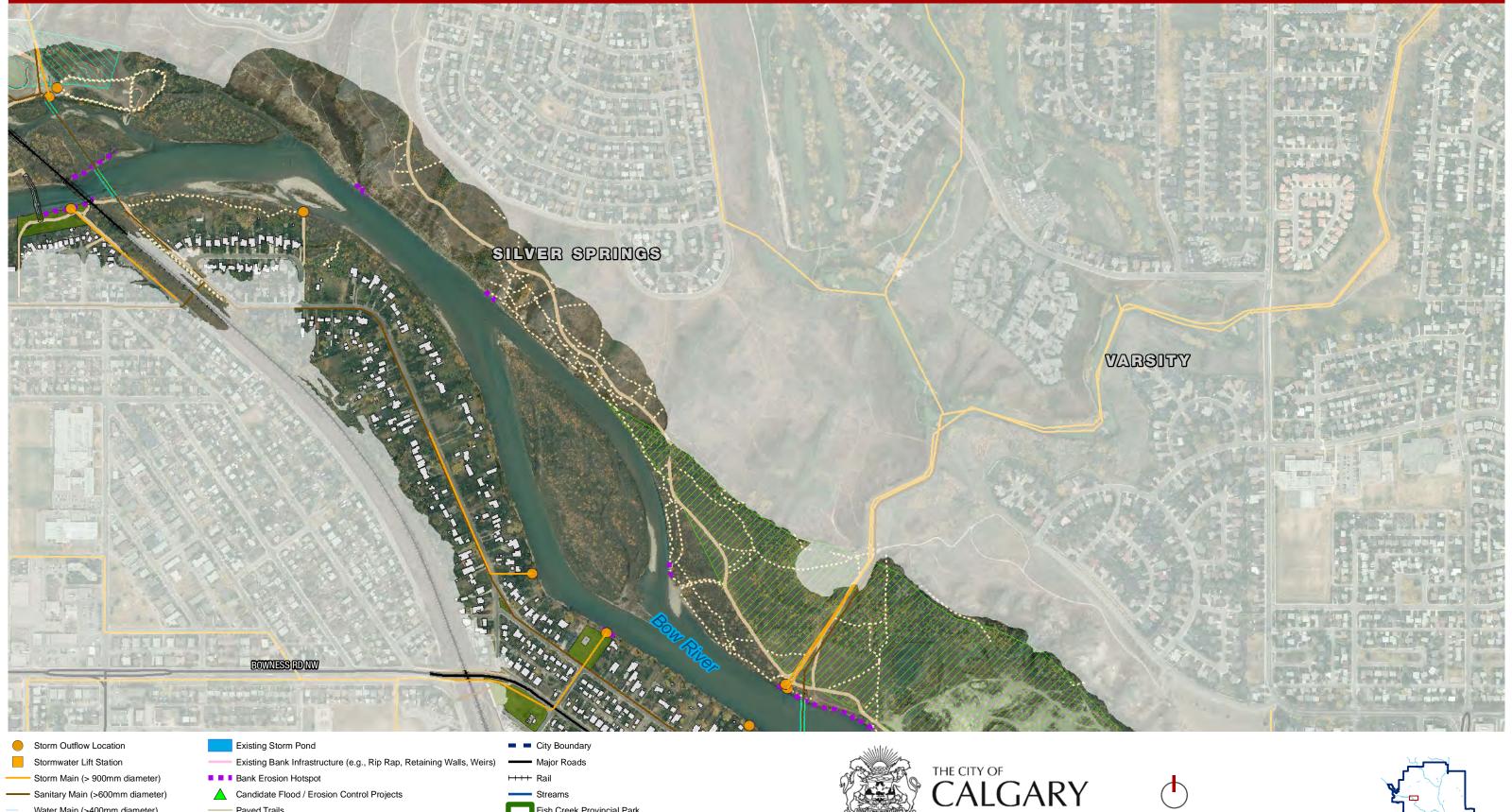
Golf Course

<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%





## EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS **BOW RIVER 03**



Water Main (>400mm diameter) **Paved Trails** Gravel Trails Pipeline River Crossing Locations Water / Waste Water Treatment Plants Buildings Existing Storm Retrofit Pond Parks (Maintained Turf Areas)

■ ■ Bank Erosion Hotspot

Candidate Flood / Erosion Control Projects

Storm Main (> 900mm diameter)

Sanitary Main (>600mm diameter)

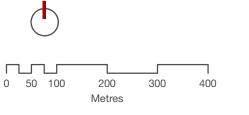
Possible Location of Storm Retrofit Pond

(i) outer riparian zone of the variable width model,
 (ii) City ER setback policy boundary,
 (iii) Nose Creek Watershed Partnership recommended setback policy

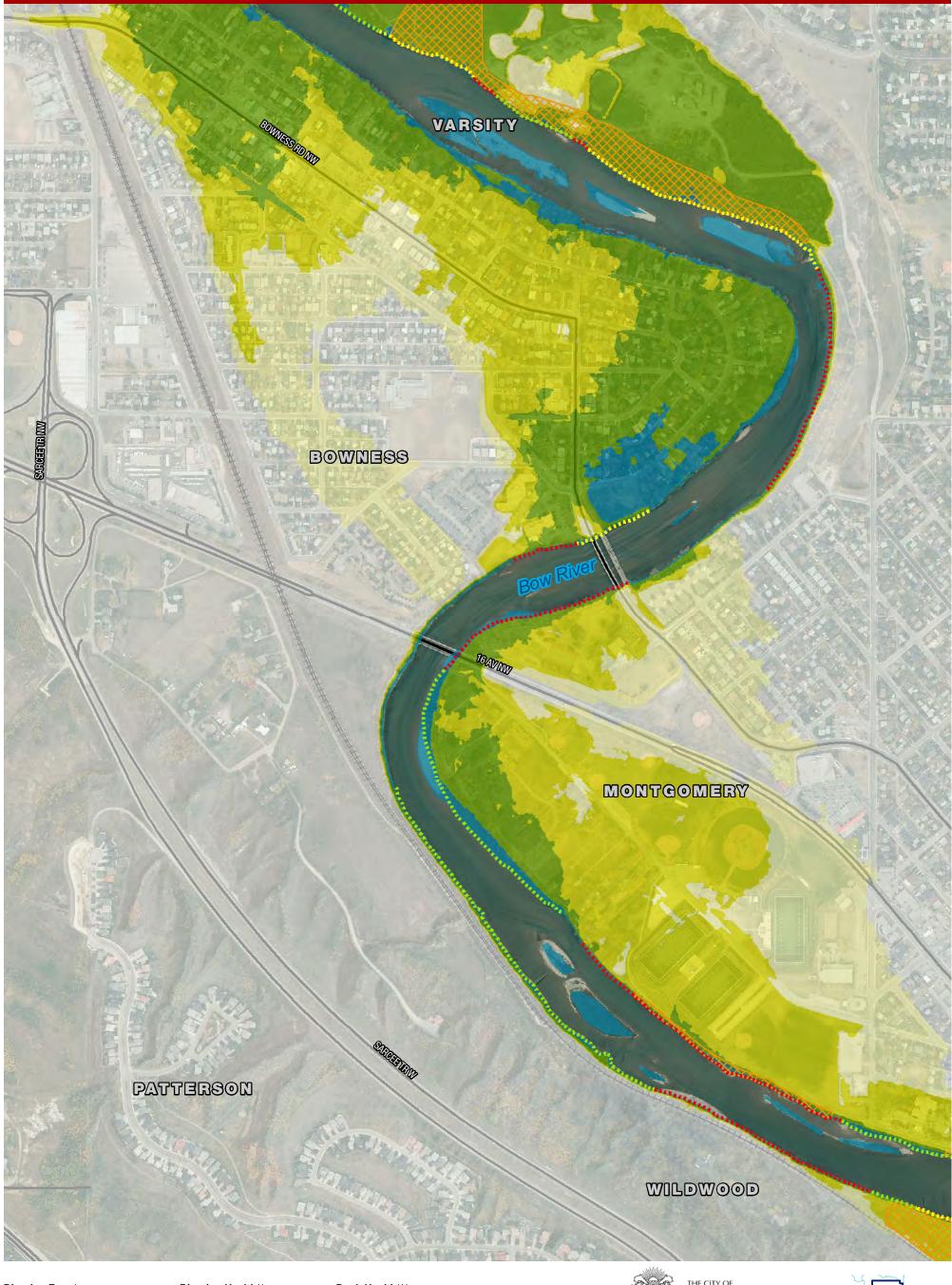
(See Theme 2-Land and Regulatory Issues)

The non-masked area is based on the greater of:

Fish Creek Provincial Park







#### Riparian Zone\*

Inner Riparian Zone Middle Riparian Zone

Potential Outermost Riparian Zone

Outer Riparian Zone

#### Riparian Health\*\*

Healthy

Healthy, but with Problems Unhealthy

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat \*\*Based on field studies of

### Bank Health\*\*\*

Good Moderate

Poor

#### City Boundary Major Roads <del>⊢</del> Rail

Streams Fish Creek Provincial Park

0 50 100





300

400

200

Metres



\*Variable Width Riparian Model Outputs

sampled riparian polygons only



Existing Storm Retrofit Pond Possible Location of Storm Retrofit Pond Existing Storm Pond

Storm Main (>900mm diameter)

Water Main (>400mm diameter)

— Pipeline River Crossing Locations ▲ Water / Waste Water Treament Plants

- - Siphon

Sanitary Main (>600mm diameter)

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)

■ Bank Erosion Hotspot

Streams Fish Creek Provincial Park

Parks (Maintained Turf Areas)

**Gravel Trails** 

= Bridge Buildings

City Boundary

Major Roads

⊢ Rail

(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy

0 50 100

(See Theme 2-Land and Regulatory Issues)





300

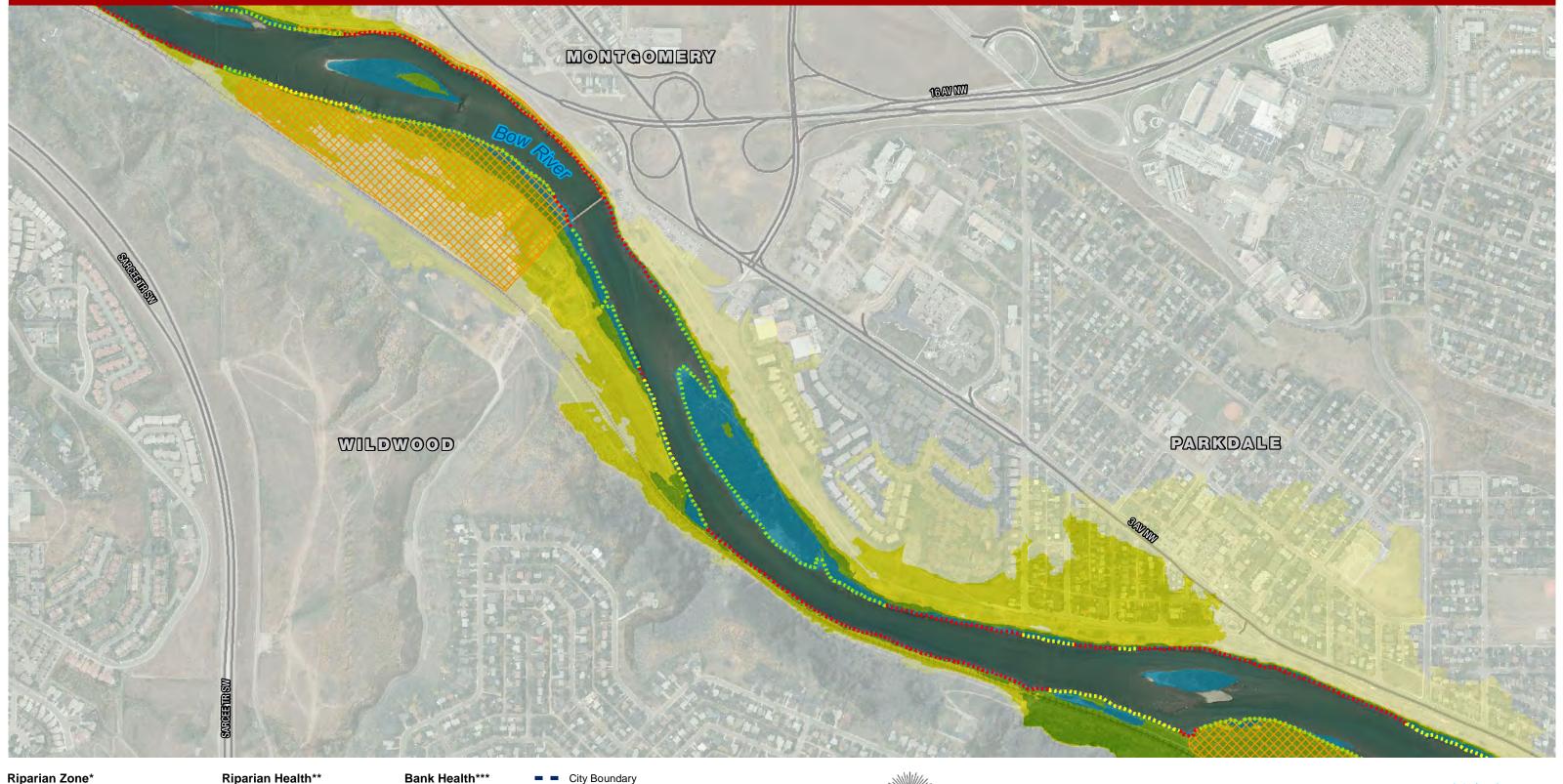
400

200

Metres



## RIPARIAN AREA - LOCATION AND FUNCTION **BOW RIVER 05**



#### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

#### Riparian Health\*\*

Healthy

Healthy, but with Problems

Unhealthy Unhealthy

#### Bank Health\*\*\*

---- Major Roads

HHH Rail

Streams

Good Moderate

or steep valley slopes with limited riparian habitat

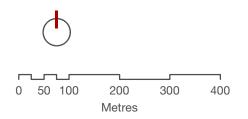
Poor

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots Fish Creek Provincial Park











Future Urban Development

Industrial

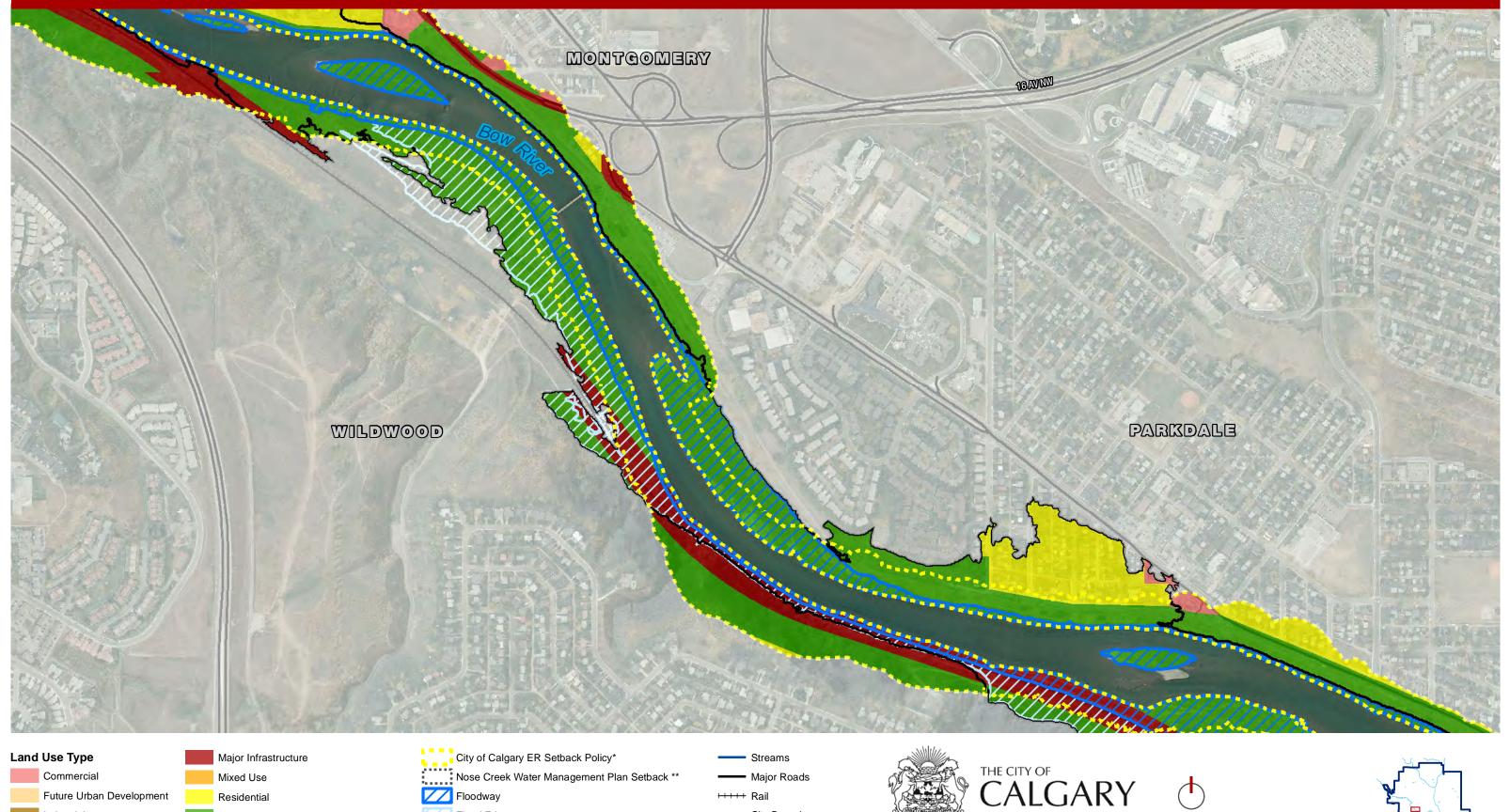
Institutional

Residential

Golf Course

Parks, Recreation and Public Education

## LAND AND REGULATORY ISSUES BOW RIVER 05



<del>□ □ □</del> Rail

City Boundary

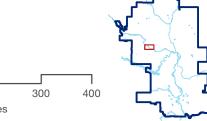
Outer Riparian Zone Boundary

Floodway

Flood Fringe

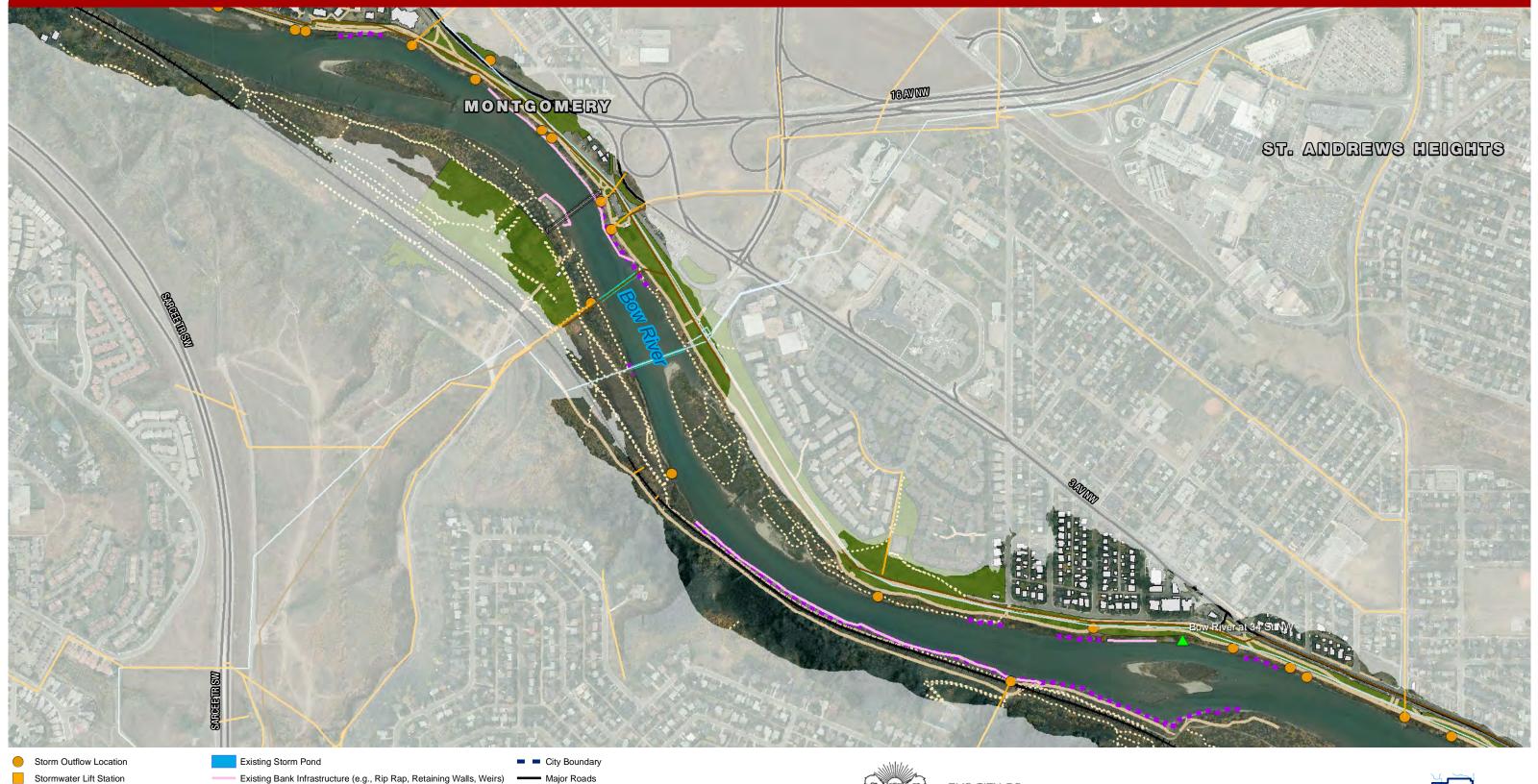
Flood Extent - 100 Year (Nose Creek/West Nose Creek) Fish Creek Provincial Park





<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

# EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS BOW RIVER 05





Possible Location of Storm Retrofit Pond

Bank Erosion Hotspot
Candidate Flood / Erosion Control Projects
Paved Trails
Gravel Trails
Bridge
Buildings
Parks (Maintained Turf Areas)

Weirs) Major Roads

HHR Rail
Streams
Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,

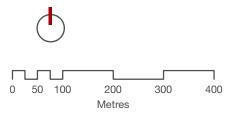
(ii) City ER setback policy boundary,

(iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)

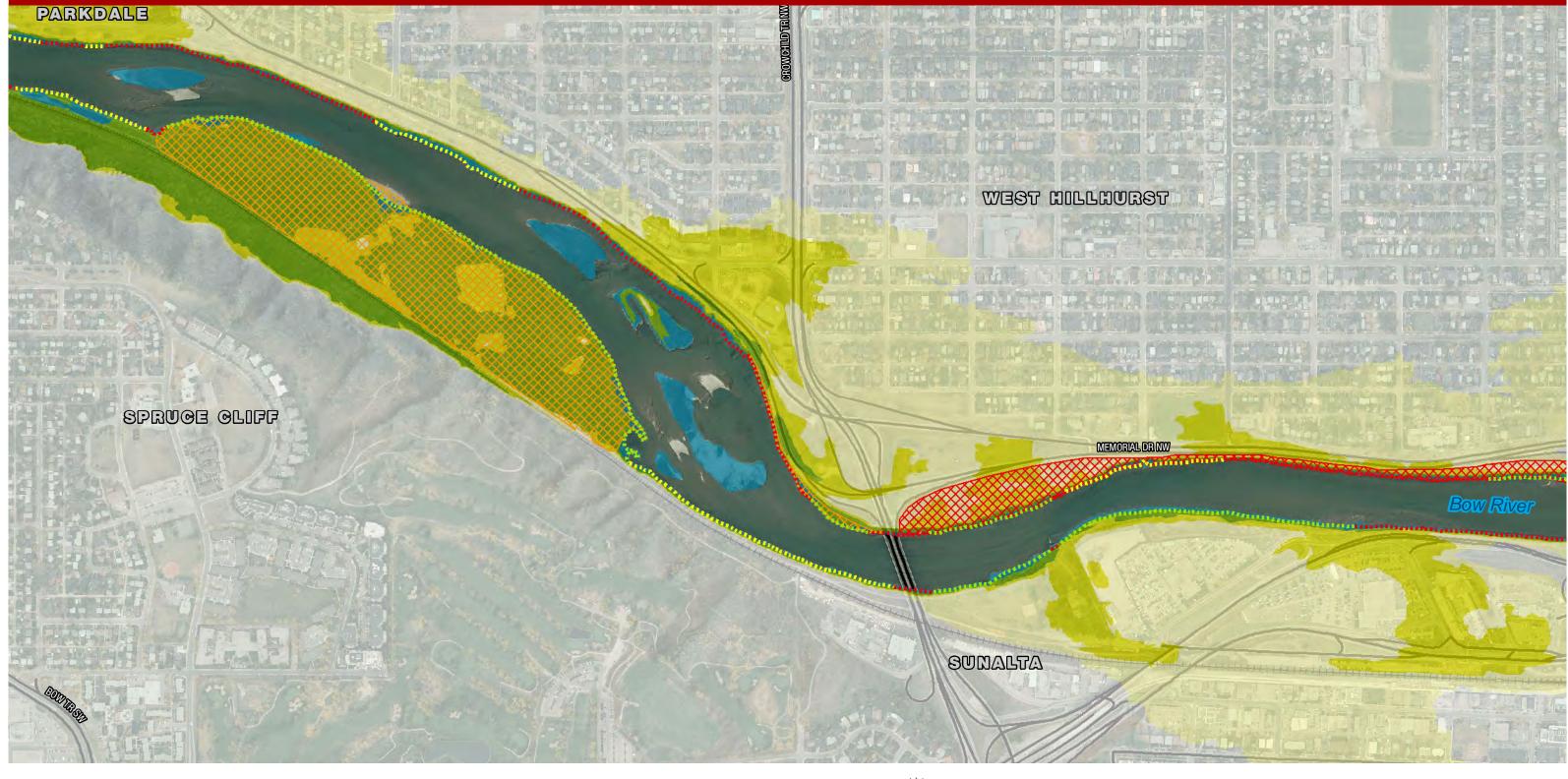








# RIPARIAN AREA - LOCATION AND FUNCTION BOW RIVER 06



#### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

#### Riparian Health\*\*

Healthy

\*\*Based on field studies of

sampled riparian polygons only

Healthy, but with Problems

Unhealthy Unhealthy

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

Good

#### Bank Health\*\*\*

City BoundaryMajor Roads

Streams

HHH Rail

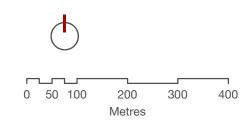
Moderate

Poor

Fish Creek Provincial Park









Future Urban Development

Industrial

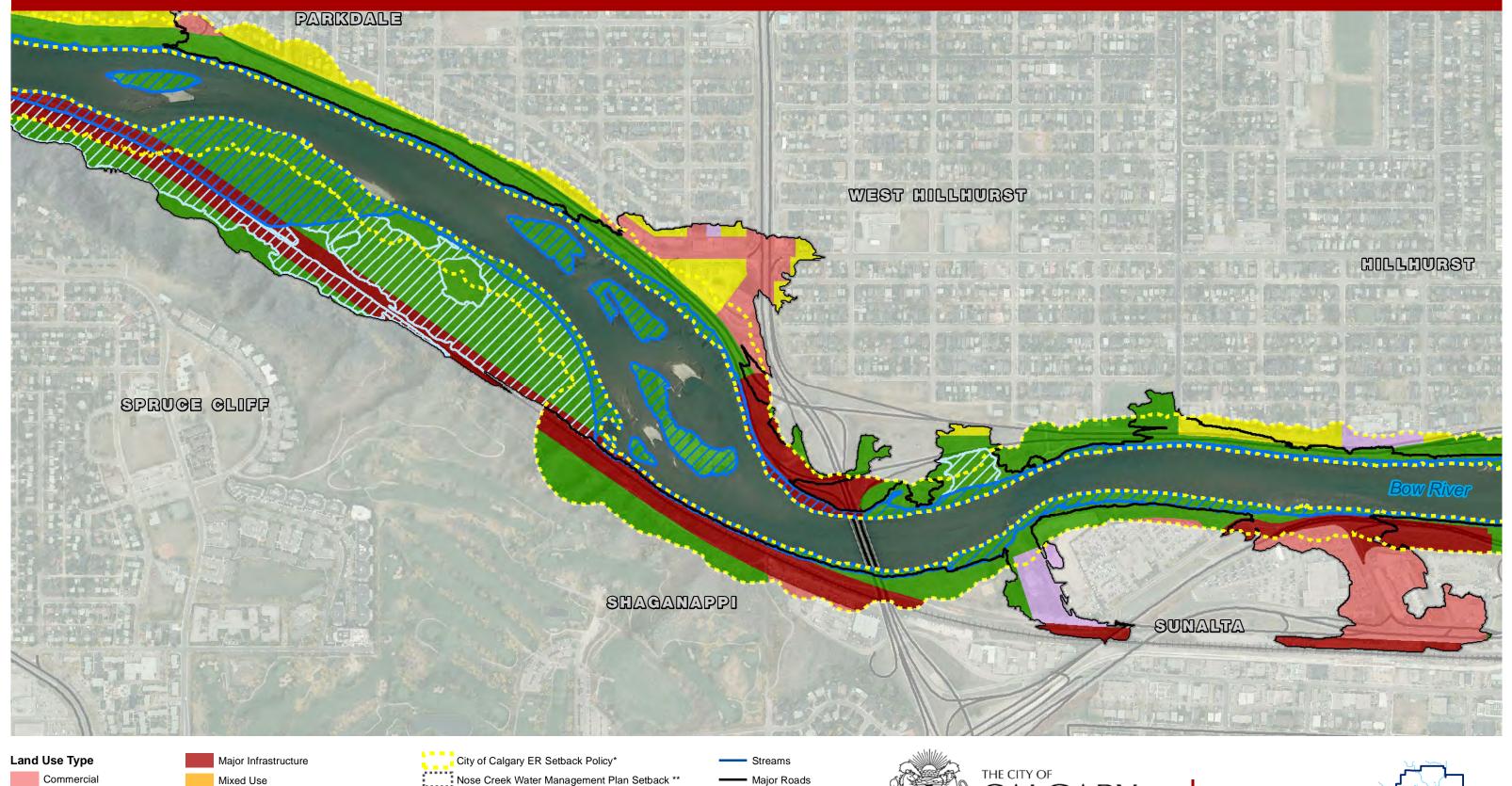
Institutional

Residential

Golf Course

Parks, Recreation and Public Education

# LAND AND REGULATORY ISSUES BOW RIVER 06



HHH Rail

City Boundary

Fish Creek Provincial Park



Outer Riparian Zone Boundary

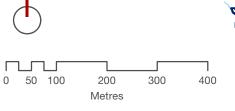
Flood Extent - 100 Year (Nose Creek/West Nose Creek)

Floodway

Flood Fringe

<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%







## EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS **BOW RIVER 06**



Stormwater Lift Station Storm Main (> 900mm diameter) Sanitary Main (>600mm diameter) Water Main (>400mm diameter) Pipeline River Crossing Locations Water / Waste Water Treatment Plants

Existing Storm Retrofit Pond

Paved Trails Gravel Trails Buildings Parks (Maintained Turf Areas) Possible Location of Storm Retrofit Pond

△ Candidate Flood / Erosion Control Projects

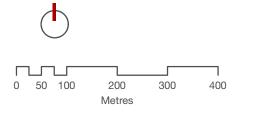
■ ■ Bank Erosion Hotspot

Major Roads Fish Creek Provincial Park The non-masked area is based on the greater of: (i) outer riparian zone of the variable width model,
 (ii) City ER setback policy boundary,
 (iii) Nose Creek Watershed Partnership
 recommended setback policy

(See Theme 2-Land and Regulatory Issues)

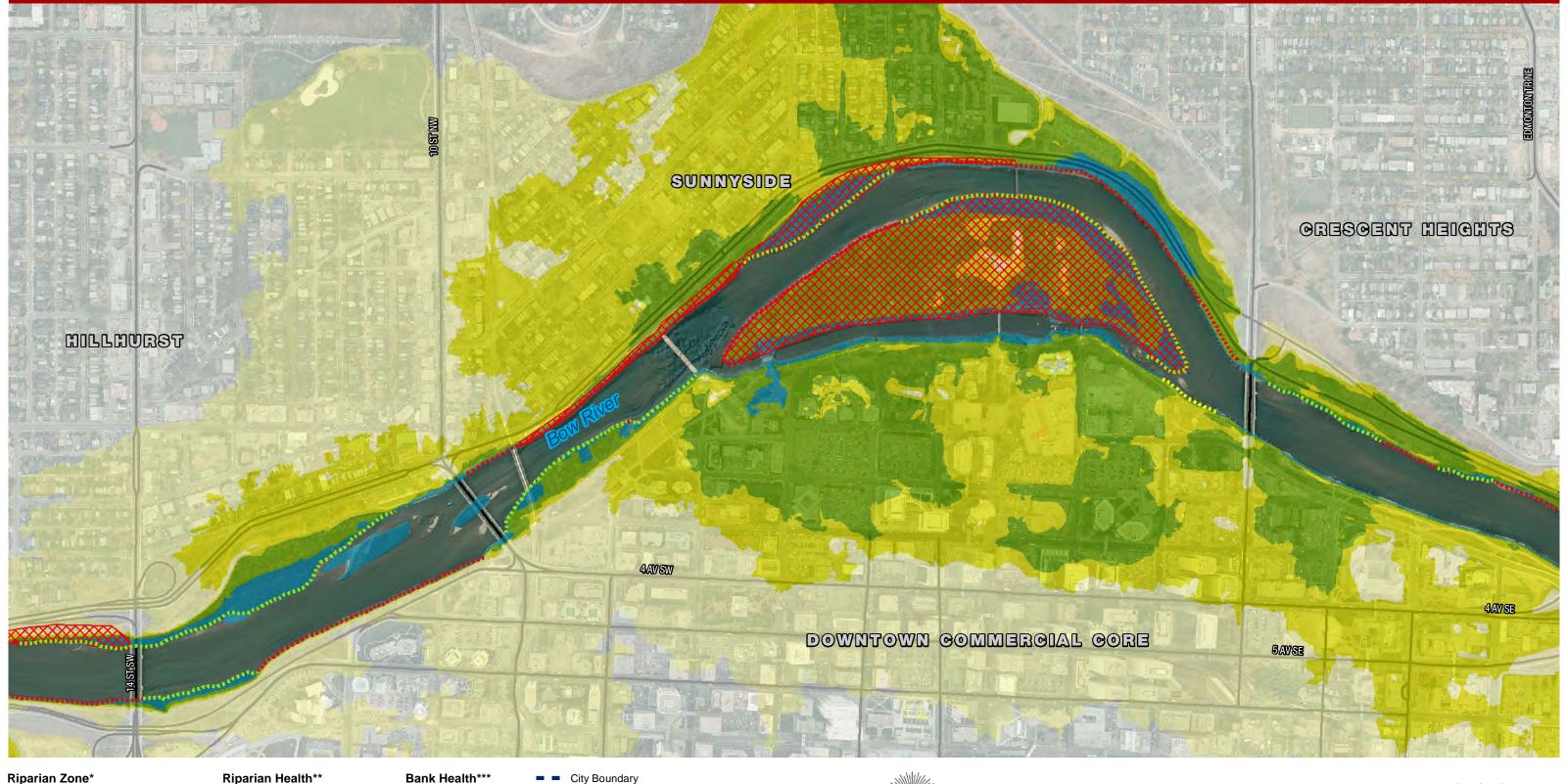


CALGARY





## RIPARIAN AREA - LOCATION AND FUNCTION **BOW RIVER 07**



#### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

Healthy

\*\*Based on field studies of

sampled riparian polygons only

Healthy, but with Problems

Unhealthy Unhealthy

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

#### Bank Health\*\*\*

Major Roads

HHH Rail

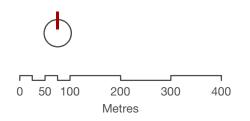
Good Moderate

Poor

Streams Fish Creek Provincial Park

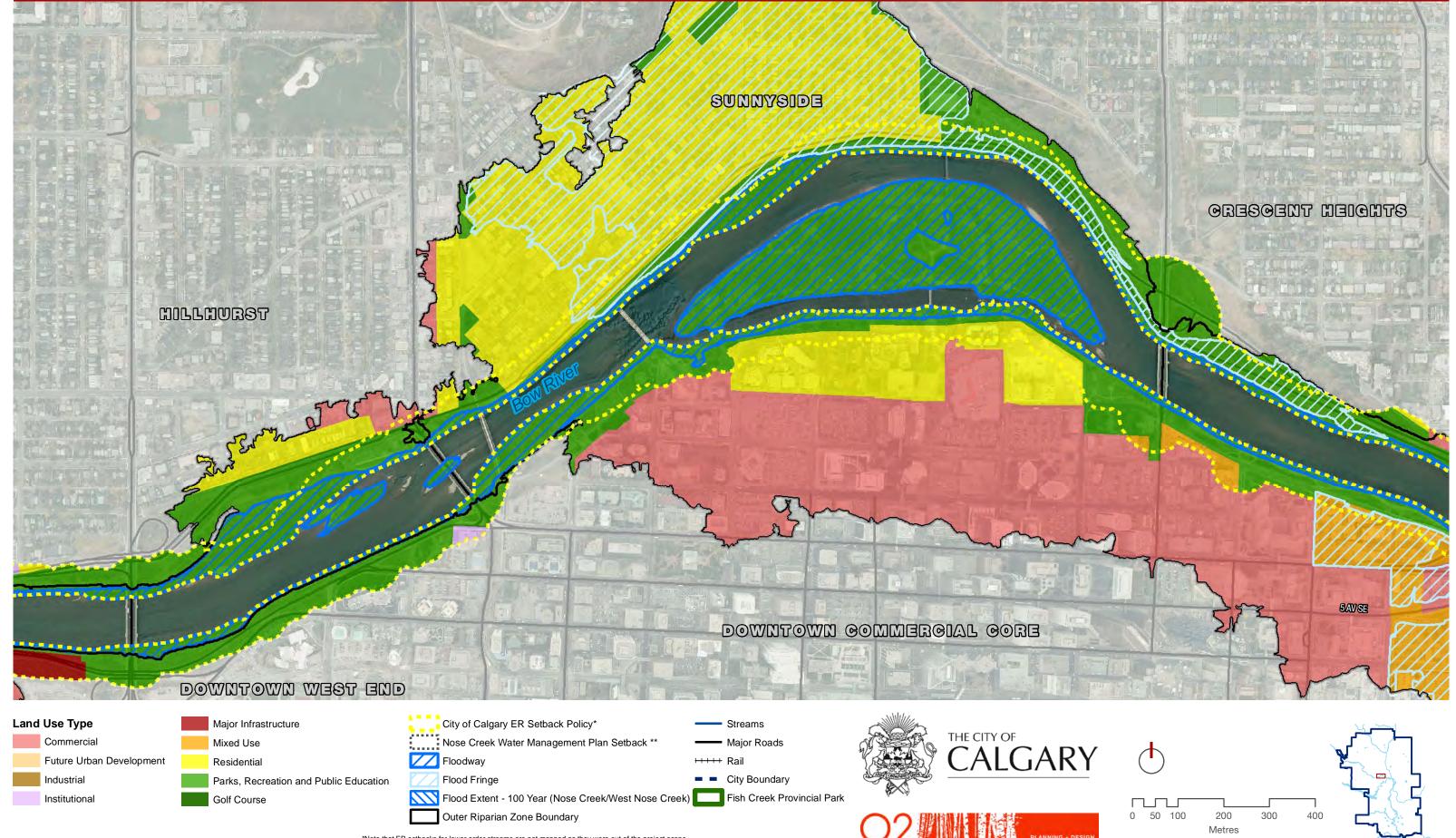








# LAND AND REGULATORY ISSUES BOW RIVER 07



<sup>\*</sup>Note that ER setbacks for lower order streams are not mapped as they were out of the project scope

<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

## EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS BOW RIVER 07



Stormwater Lift Station Storm Main (> 900mm diameter) Sanitary Main (>600mm diameter) Water Main (>400mm diameter) Pipeline River Crossing Locations

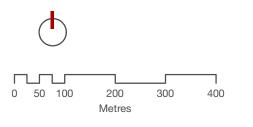
△ Candidate Flood / Erosion Control Projects Paved Trails Gravel Trails ==== Bridge Water / Waste Water Treatment Plants Buildings Existing Storm Retrofit Pond Parks (Maintained Turf Areas) Possible Location of Storm Retrofit Pond

■ ■ Bank Erosion Hotspot

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs) Major Roads Fish Creek Provincial Park The non-masked area is based on the greater of: (i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy

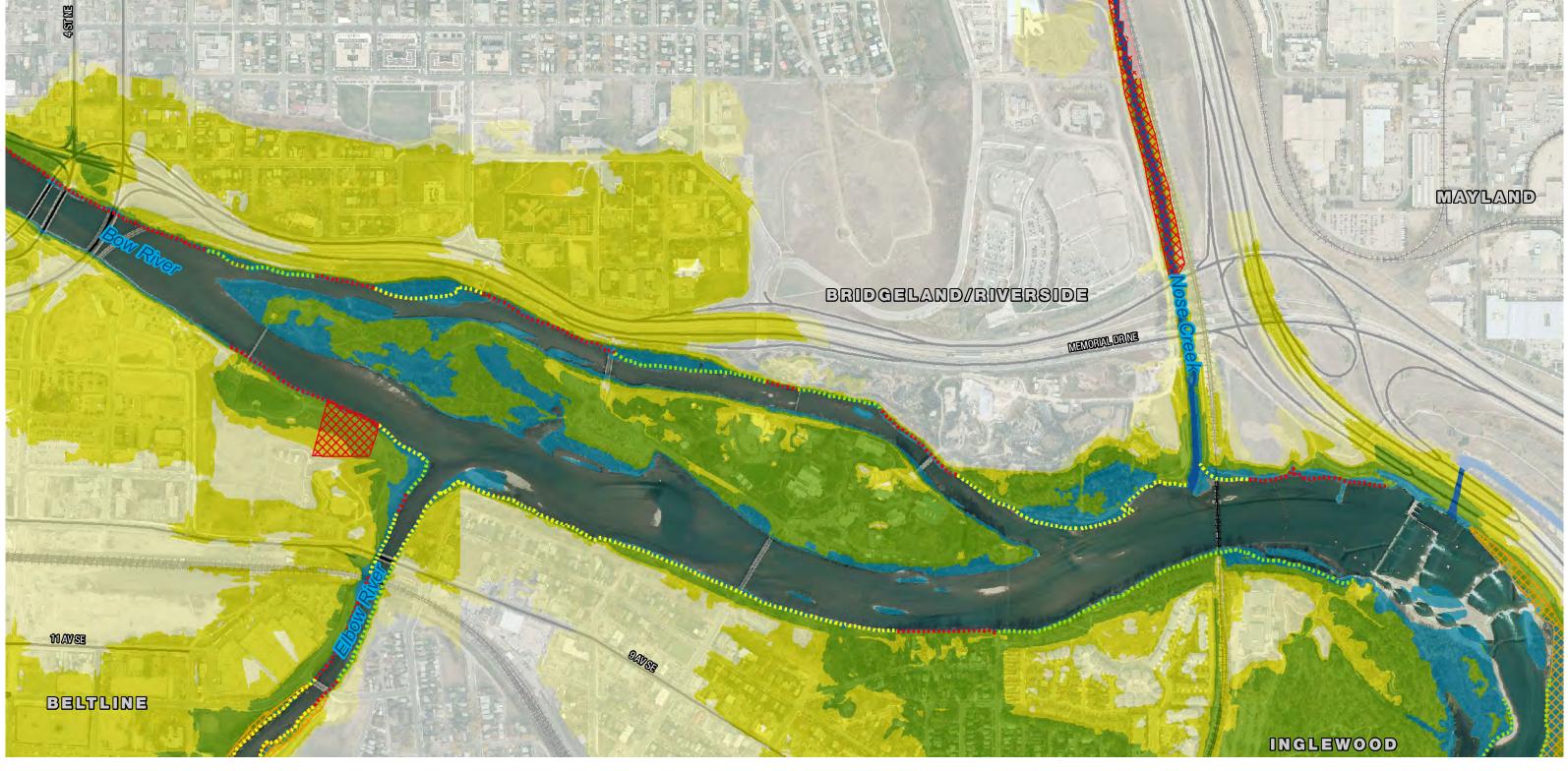
(See Theme 2-Land and Regulatory Issues)







## RIPARIAN AREA - LOCATION AND FUNCTION **BOW RIVER 08**



#### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

\*\*Based on field studies of sampled riparian polygons only

#### Riparian Health\*\*

Healthy

Healthy, but with Problems

Unhealthy Unhealthy

#### Bank Health\*\*\*

Good

Moderate

Poor

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

### City Boundary

Major Roads

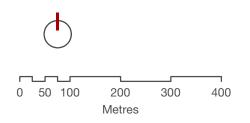
HHH Rail

Streams

Fish Creek Provincial Park

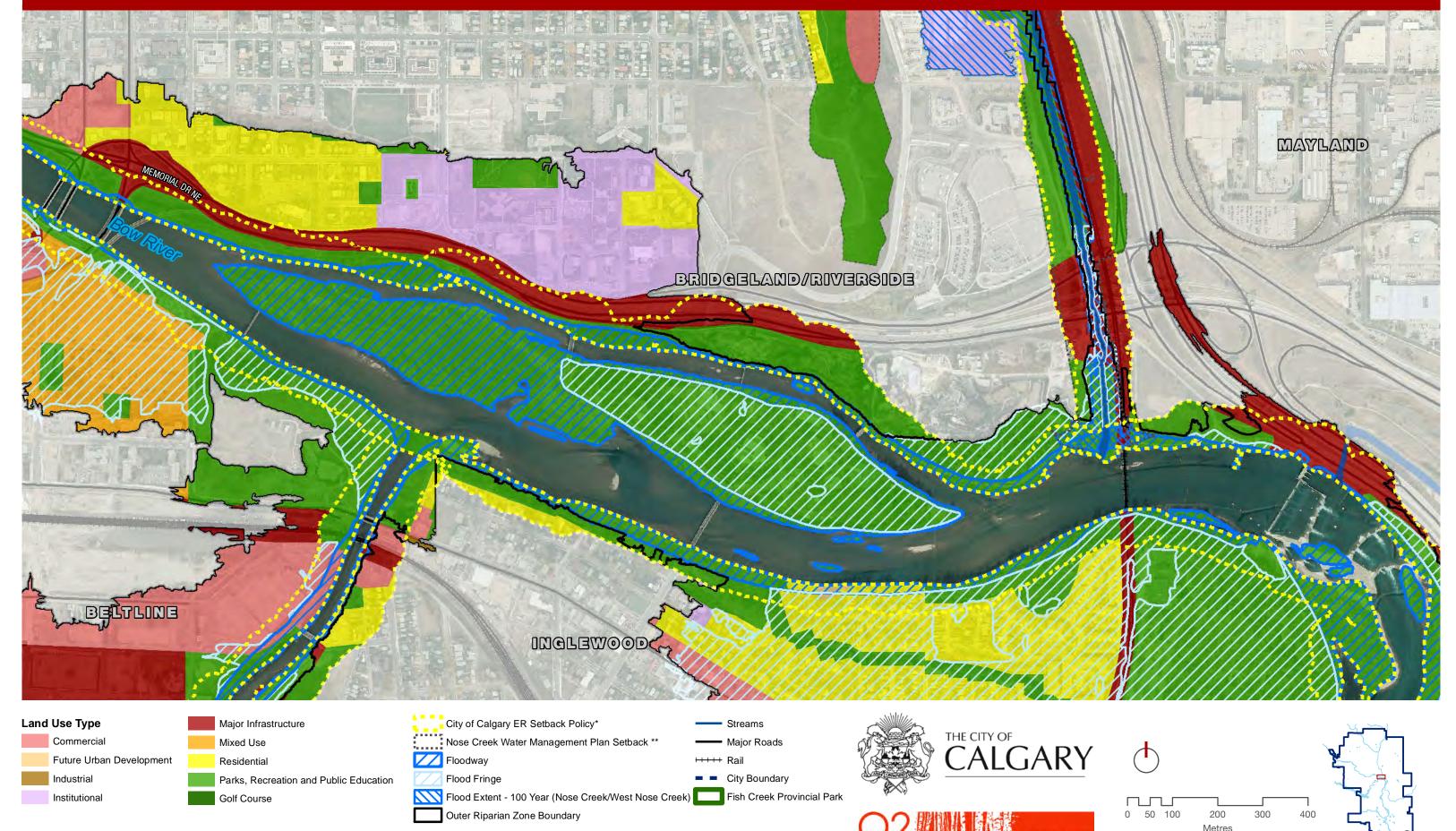








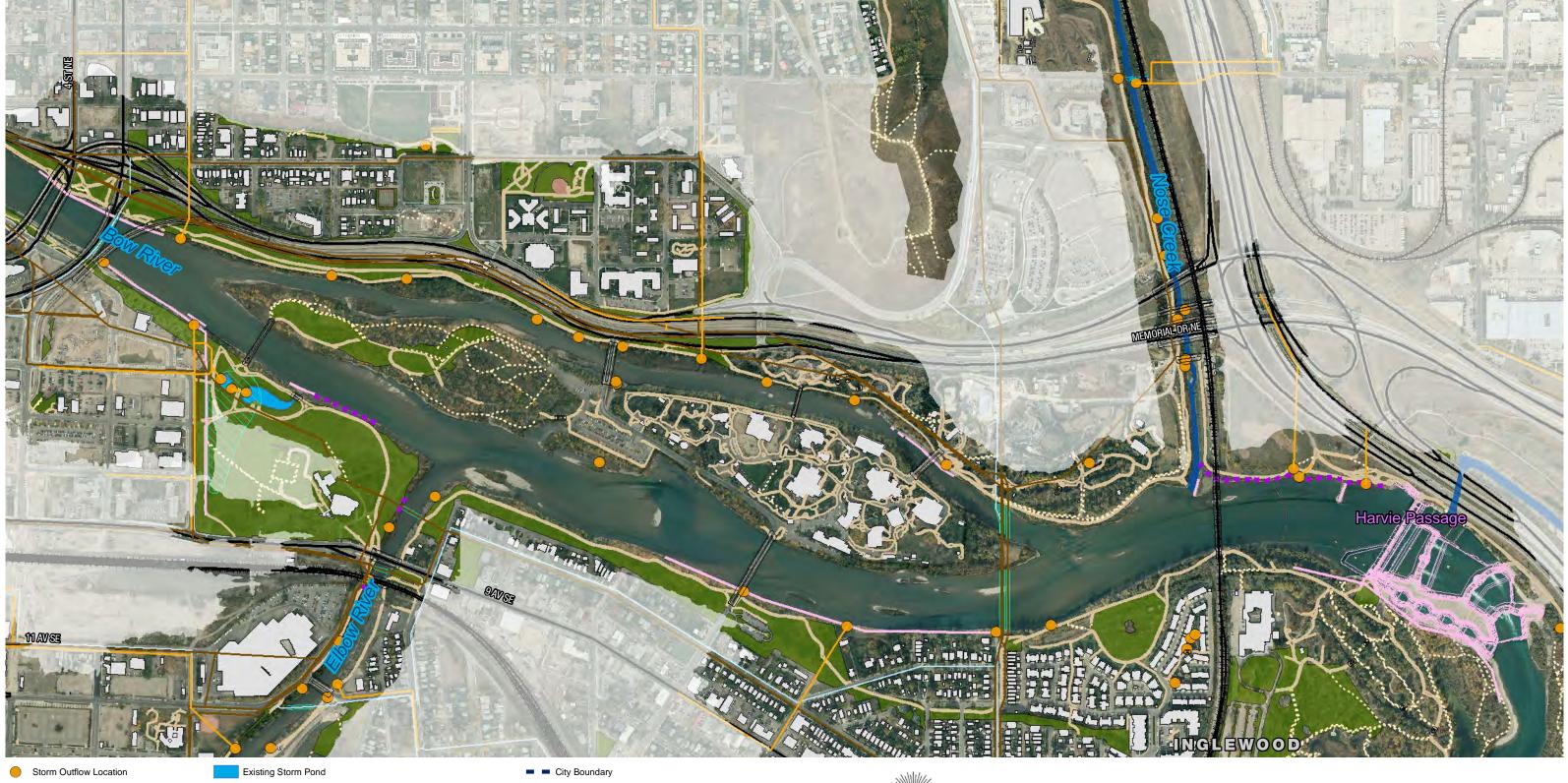
# LAND AND REGULATORY ISSUES BOW RIVER 08



Note that ER setbacks for lower order streams are not mapped as they were out of the project scope

<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

## EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS **BOW RIVER 08**



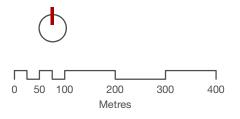
- Storm Main (> 900mm diameter)
- Sanitary Main (>600mm diameter)
- Water Main (>400mm diameter)
- Pipeline River Crossing Locations Water / Waste Water Treatment Plants
- Existing Storm Retrofit Pond Possible Location of Storm Retrofit Pond

- Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)
- ■ Bank Erosion Hotspot
- Candidate Flood / Erosion Control Projects
- **Paved Trails**
- Gravel Trails
- Buildings
- Parks (Maintained Turf Areas)

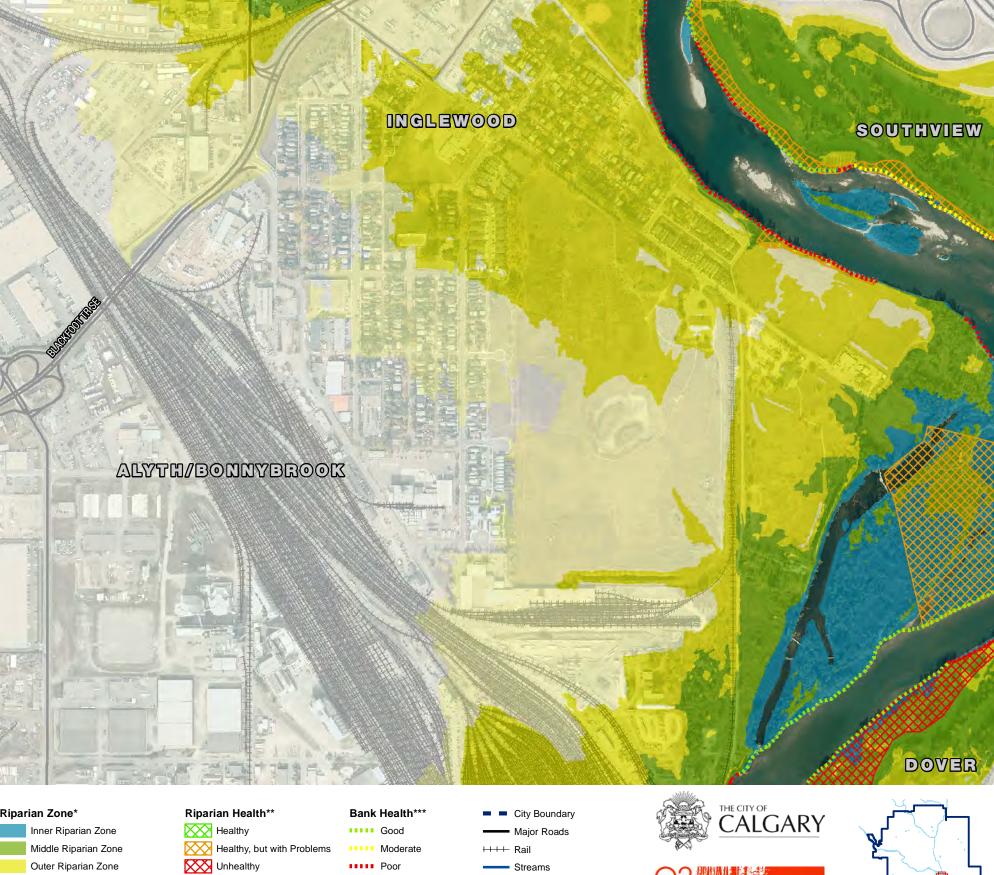
- Major Roads
- Fish Creek Provincial Park
- The non-masked area is based on the greater of:
- (i) outer riparian zone of the variable width model,
   (ii) City ER setback policy boundary,
   (iii) Nose Creek Watershed Partnership
   recommended setback policy
- (See Theme 2-Land and Regulatory Issues)











#### Riparian Zone\*

Potential Outermost Riparian Zone

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

Fish Creek Provincial Park

0 50 100

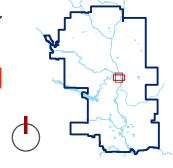


300

400

200

Metres



### EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS **BOW RIVER 09**



Stormwater Lift Station

Storm Main (>900mm diameter)

Sanitary Main (>600mm diameter)

Water Main (>400mm diameter) - - Siphon

— Pipeline River Crossing Locations Mater / Waste Water Treament Plants

Existing Storm Retrofit Pond

■ Bank Erosion Hotspot

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)

Paved Trails **Gravel Trails** 

= Bridge Buildings

Parks (Maintained Turf Areas)

City Boundary

Major Roads ⊢ Rail

Streams

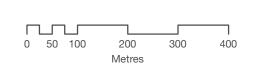
Fish Creek Provincial Park

(i) outer riparian zone of the variable width model, (iii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy

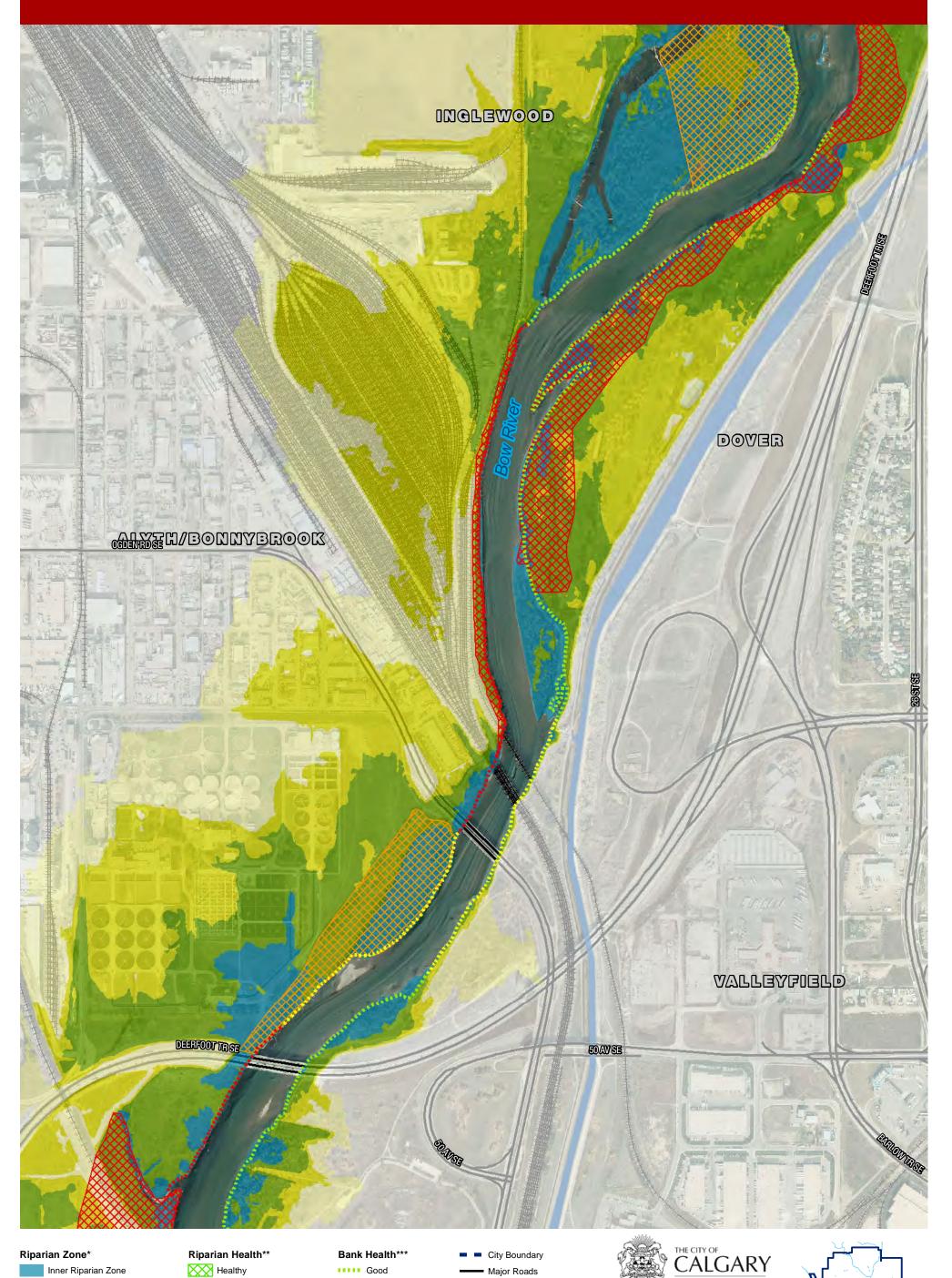
(See Theme 2-Land and Regulatory Issues)











Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

Unhealthy

Healthy, but with Problems

Moderate

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

Poor

++++ Rail

Streams

Fish Creek Provincial Park

0 50 100

200

Metres

300

400



Future Urban Development

Institutional Major Infrastructure Mixed Use

Residential Parks, Recreation and Public Education Golf Course

Nose Creek Watershed Partnership Setback\*\*

Floodway

Flood Fringe Flood Extent - 100 Year (Nose Creek/West Nose Creek)

Outer Riparian Zone Boundary Streams

Major Roads

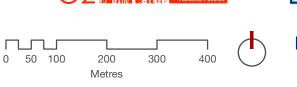
HH Rail

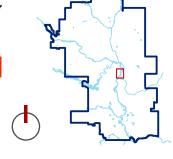
\*Note that ER setbacks for lower order streams are not mapped as they were out of the project scope

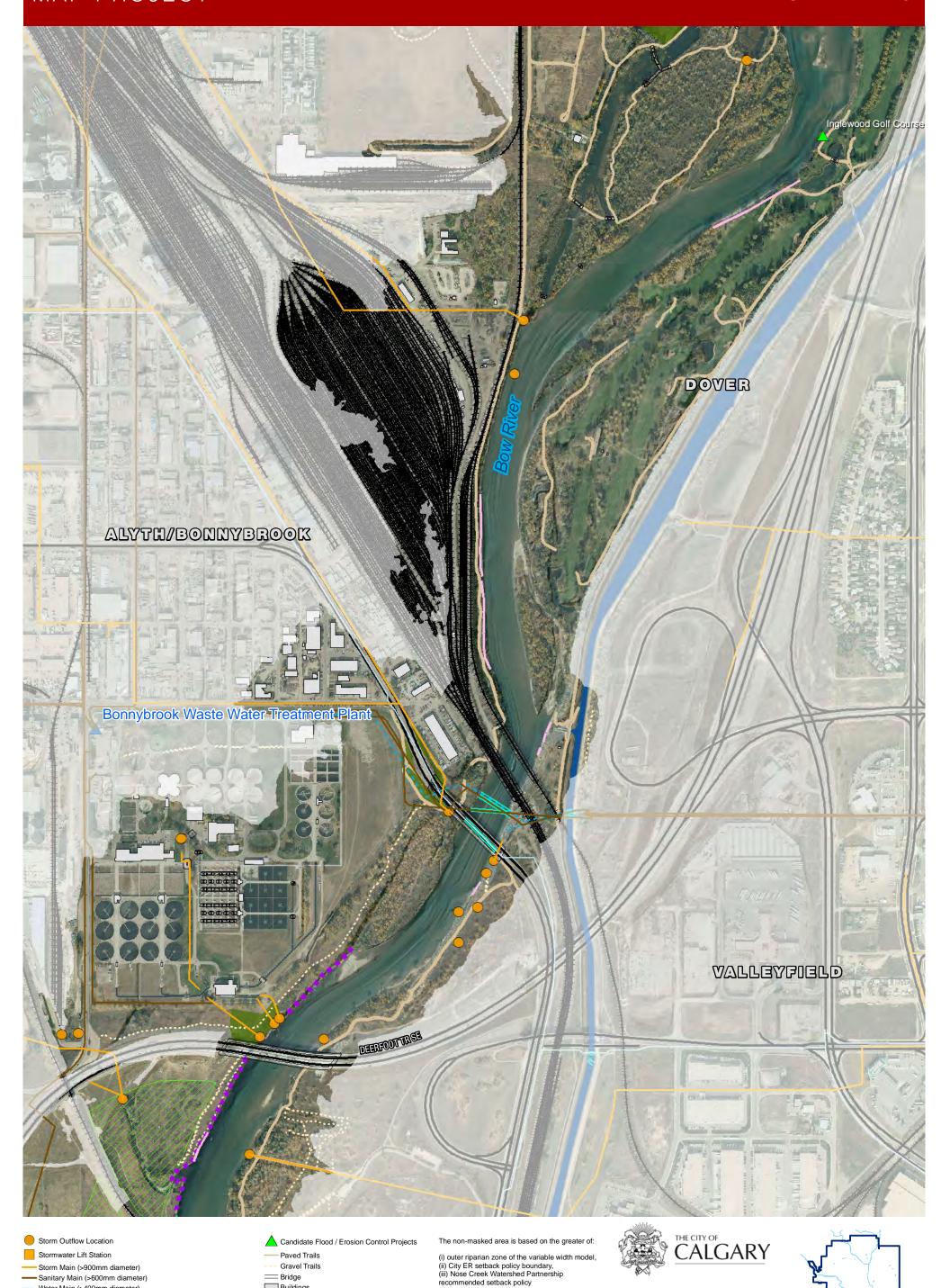
\*\*Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%











(See Theme 2-Land and Regulatory Issues)

0 50 100

200

Metres

300

400

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs) ■ Bank Erosion Hotspot

Existing Storm Retrofit Pond

Water Main (>400mm diameter)

Possible Location of Storm Retrofit Pond

Pipeline River Crossing Locations Mater / Waste Water Treament Plants

- - Siphon

Buildings

⊢ Rail

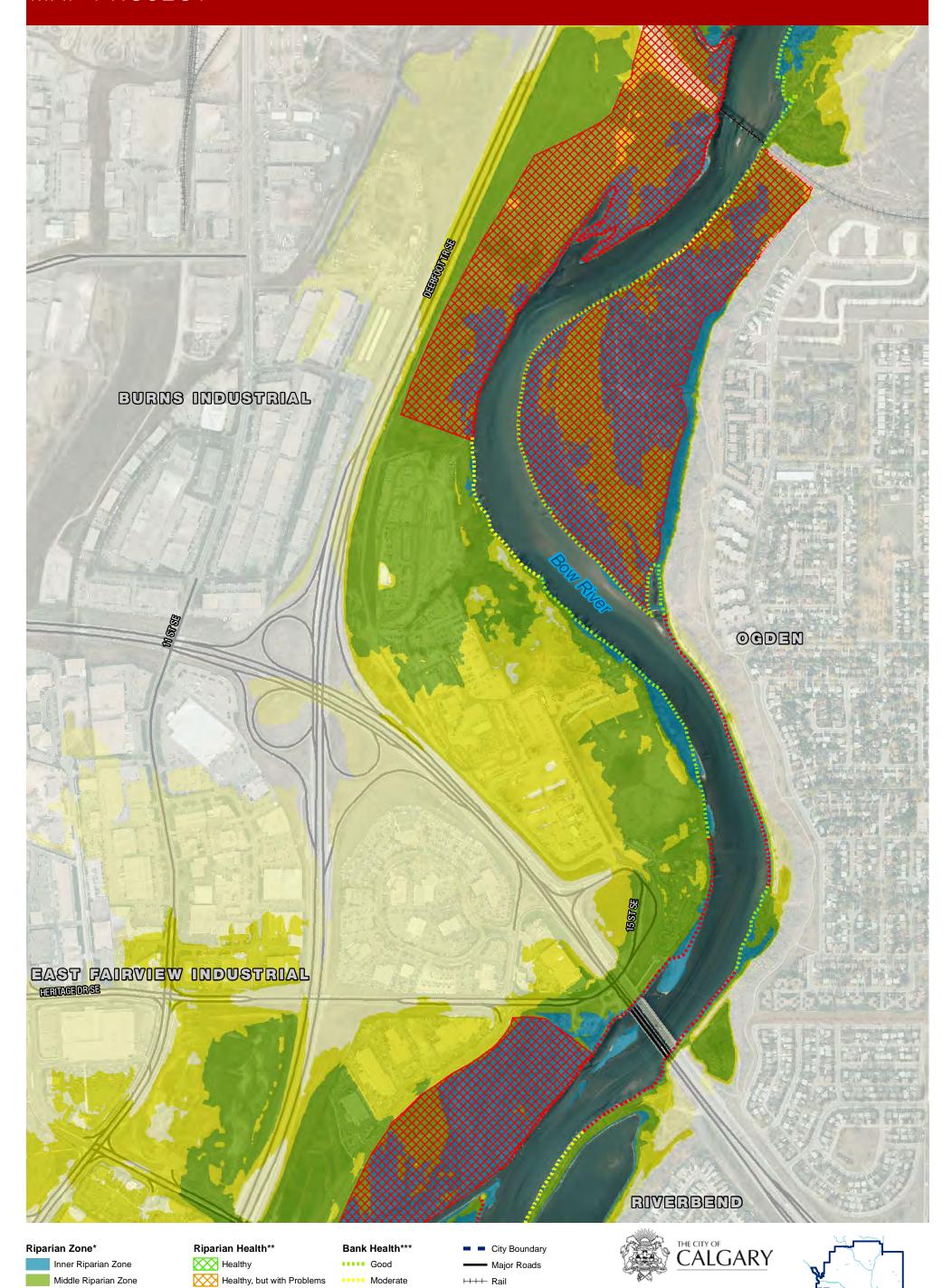
City Boundary

Major Roads

Streams

Parks (Maintained Turf Areas)

Fish Creek Provincial Park



Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

Unhealthy

Moderate

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

Poor

<del>⊢</del> Rail

Streams

Fish Creek Provincial Park

0 50 100

200

Metres

300

400

Major Infrastructure

Parks, Recreation and Public Education

Mixed Use

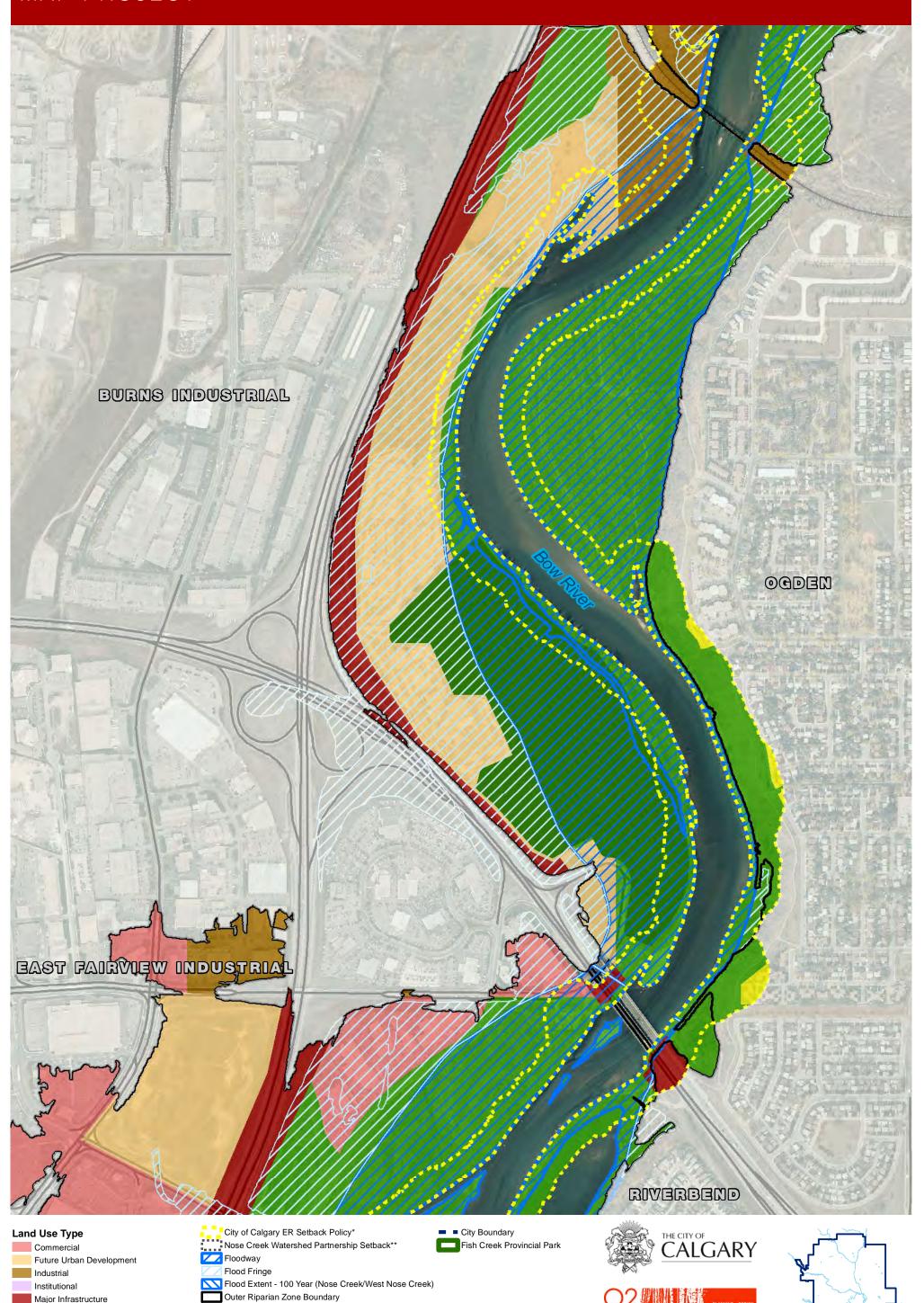
Residential

Golf Course

Streams

HH Rail

Major Roads



\*Note that ER setbacks for lower order streams are not mapped as they were out of the project scope

\*\*Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

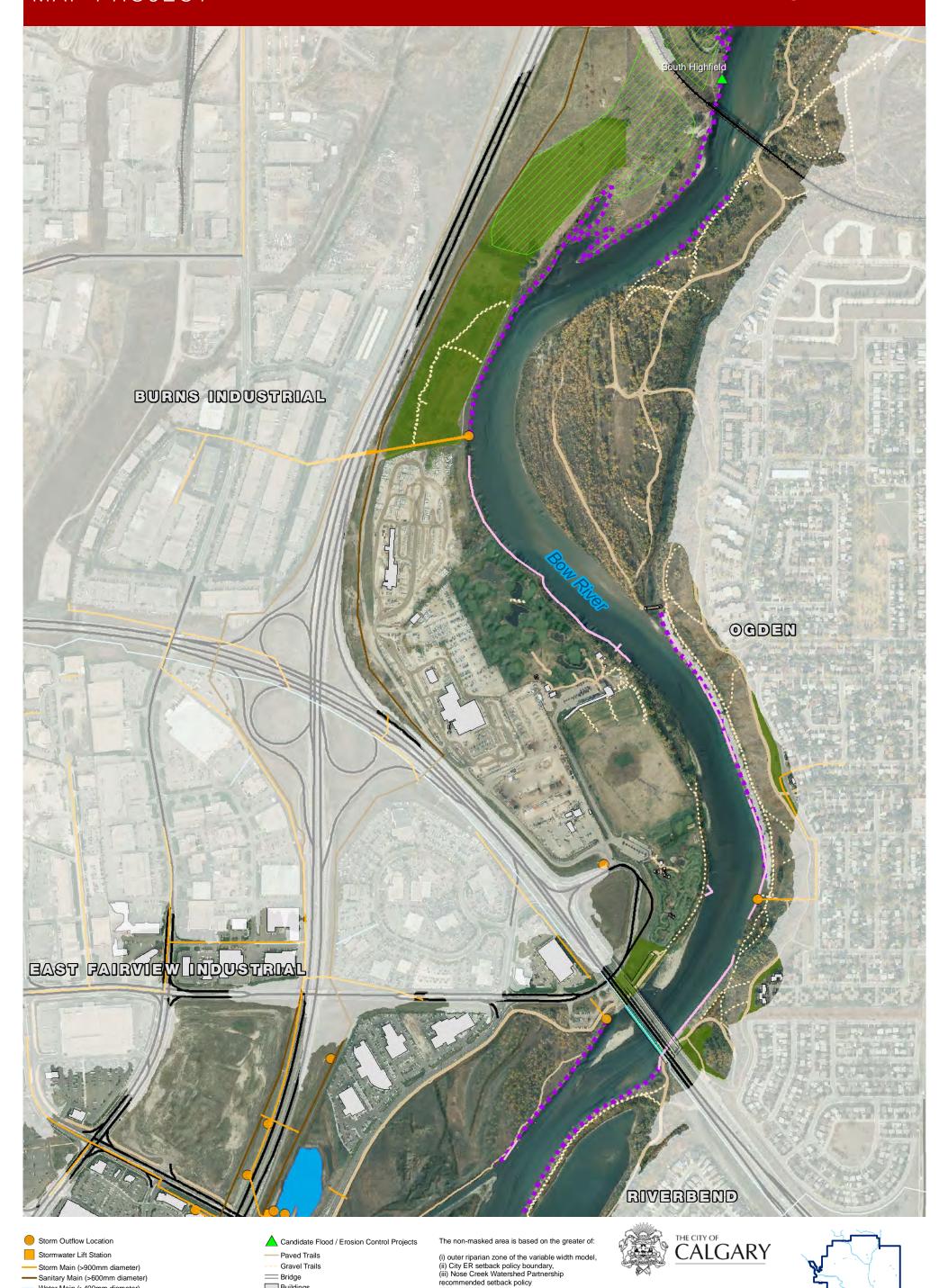
0 50 100

200

Metres

300

400



(See Theme 2-Land and Regulatory Issues)

0 50 100

200

Metres

300

400

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs) ■ Bank Erosion Hotspot

Water Main (>400mm diameter)

Possible Location of Storm Retrofit Pond

Pipeline River Crossing Locations Mater / Waste Water Treament Plants

Existing Storm Retrofit Pond

- - Siphon

Buildings

<del>⊢</del> Rail

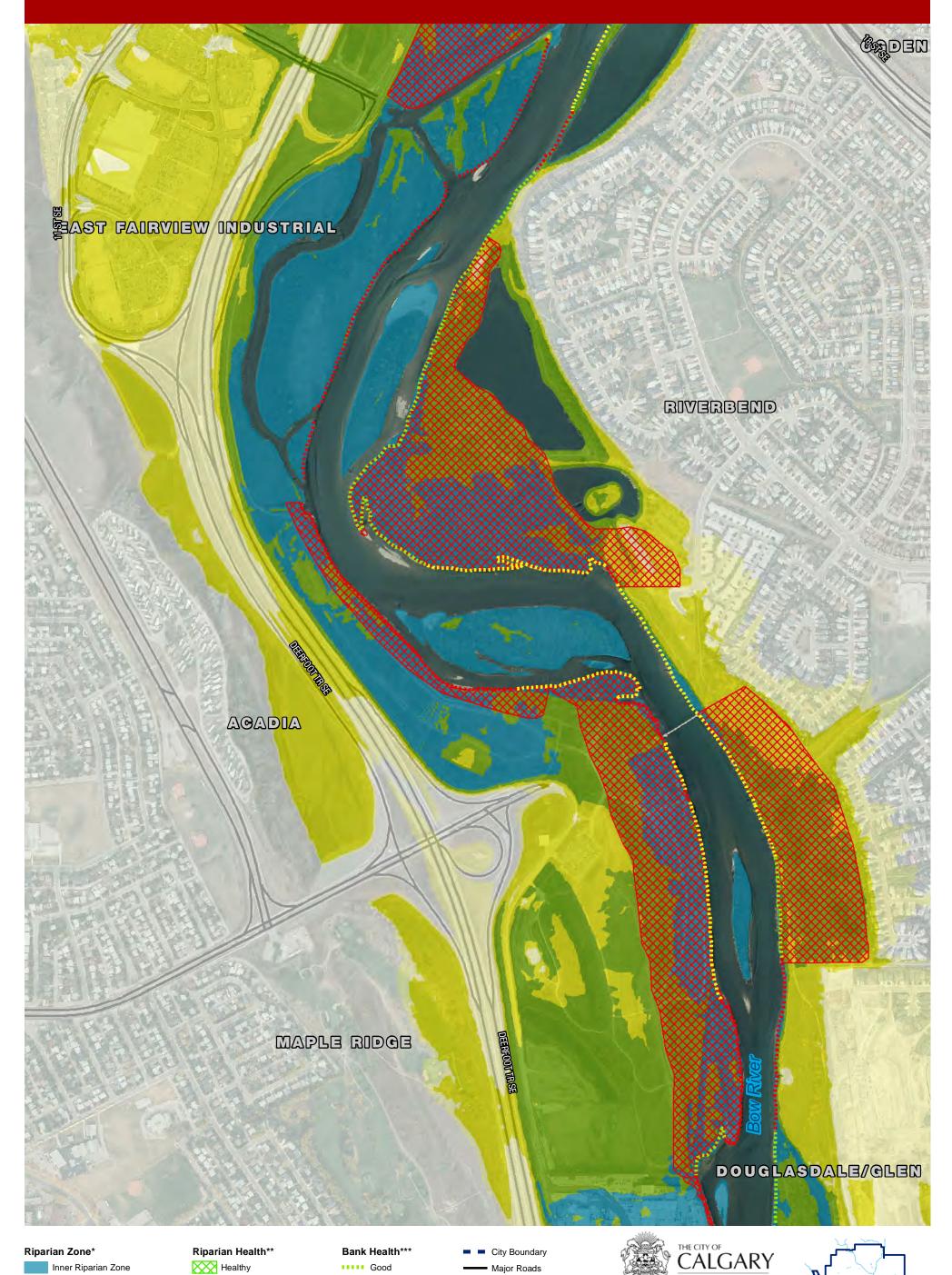
City Boundary

Major Roads

Streams

Parks (Maintained Turf Areas)

Fish Creek Provincial Park



Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

Healthy, but with Problems

Good

Moderate Poor

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

Major Roads

Streams

Fish Creek Provincial Park

0 50 100

200

Metres

300

400

<del>⊢</del> Rail

Healthy

Unhealthy



- - Siphon Pipeline River Crossing Locations Mater / Waste Water Treament Plants Existing Storm Retrofit Pond Possible Location of Storm Retrofit Pond

Stormwater Lift Station

■ Bank Erosion Hotspot

Storm Main (>900mm diameter) Sanitary Main (>600mm diameter)

Water Main (>400mm diameter)

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)

City Boundary

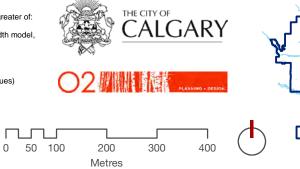
Major Roads ⊢ Rail Streams Fish Creek Provincial Park

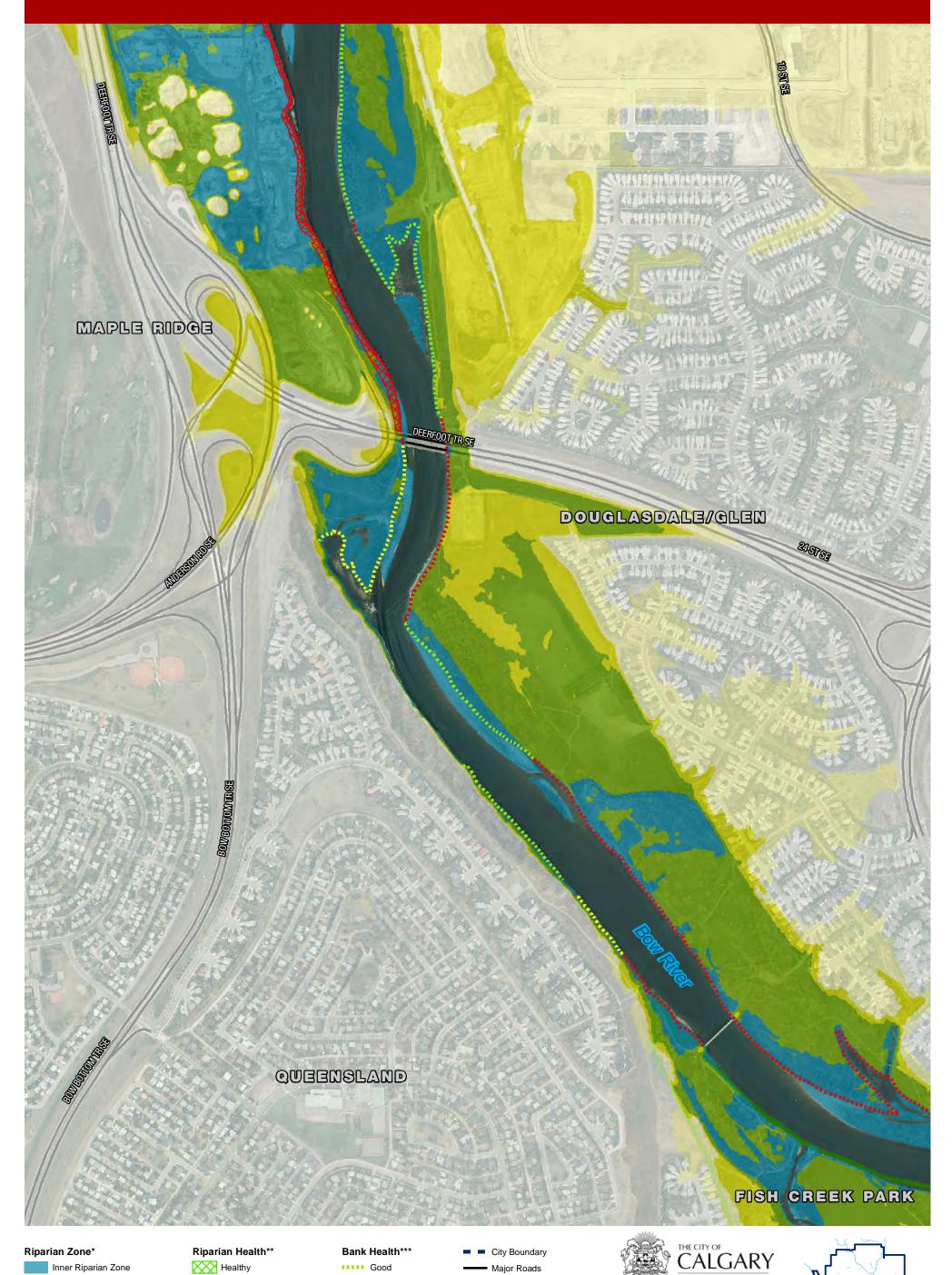
Buildings
Parks (Maintained Turf Areas)

Paved Trails **Gravel Trails** 

= Bridge

(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy





<del>⊢</del> Rail

Streams

Fish Creek Provincial Park

0 50 100

300

200 Metres 400

Moderate
Poor

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

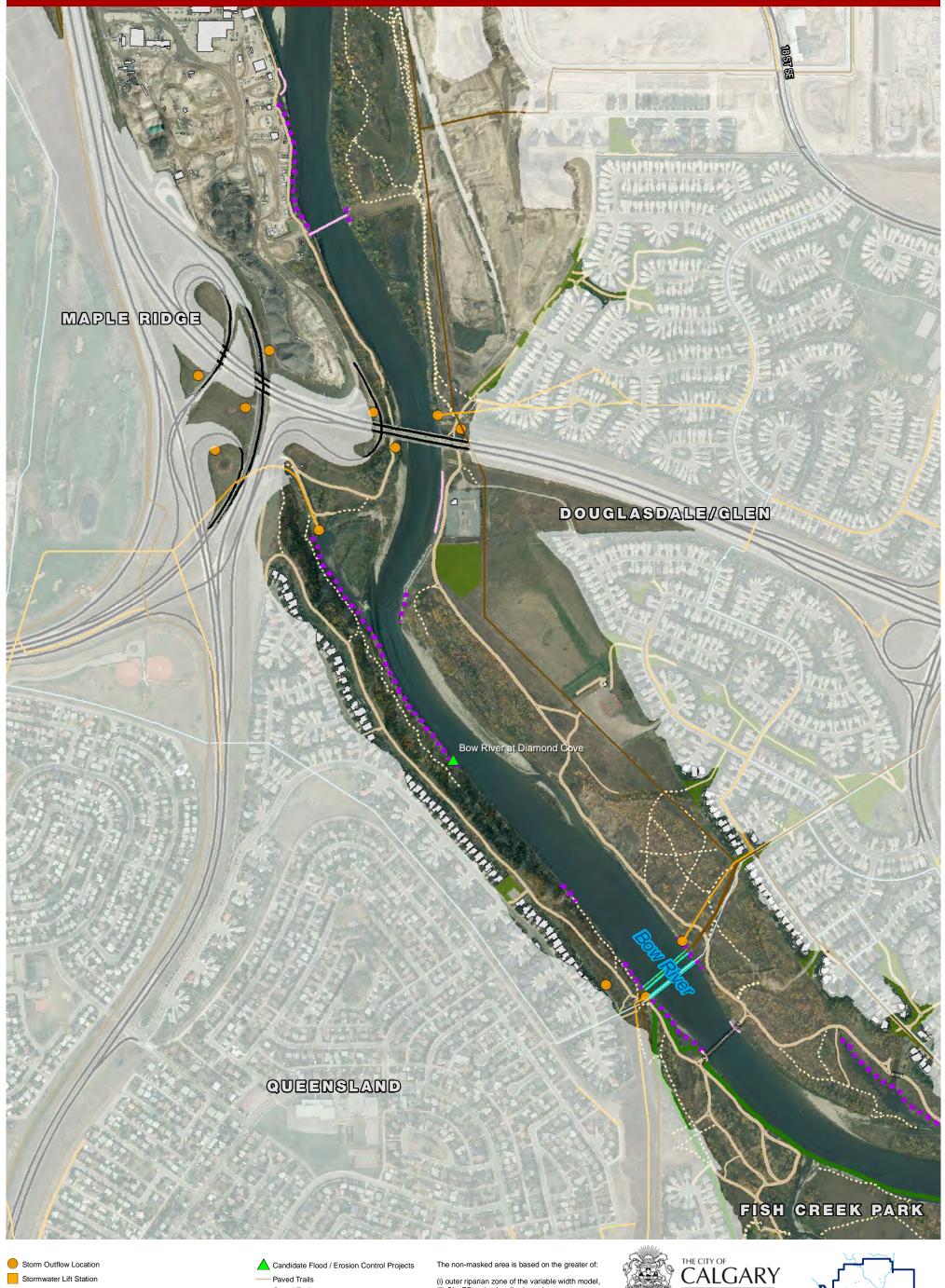
Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

Unhealthy

Healthy, but with Problems



Existing Storm Pond

■ Bank Erosion Hotspot

Storm Main (>900mm diameter)

Water Main (>400mm diameter)

— Pipeline River Crossing Locations Mater / Waste Water Treament Plants

- - Siphon

Sanitary Main (>600mm diameter)

Existing Storm Retrofit Pond

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)

**Gravel Trails** 

Parks (Maintained Turf Areas)

Fish Creek Provincial Park

= Bridge Buildings

City Boundary

Major Roads

Streams

⊢ Rail

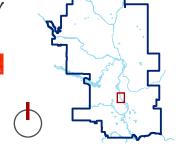
(i) outer riparian zone of the variable width model,

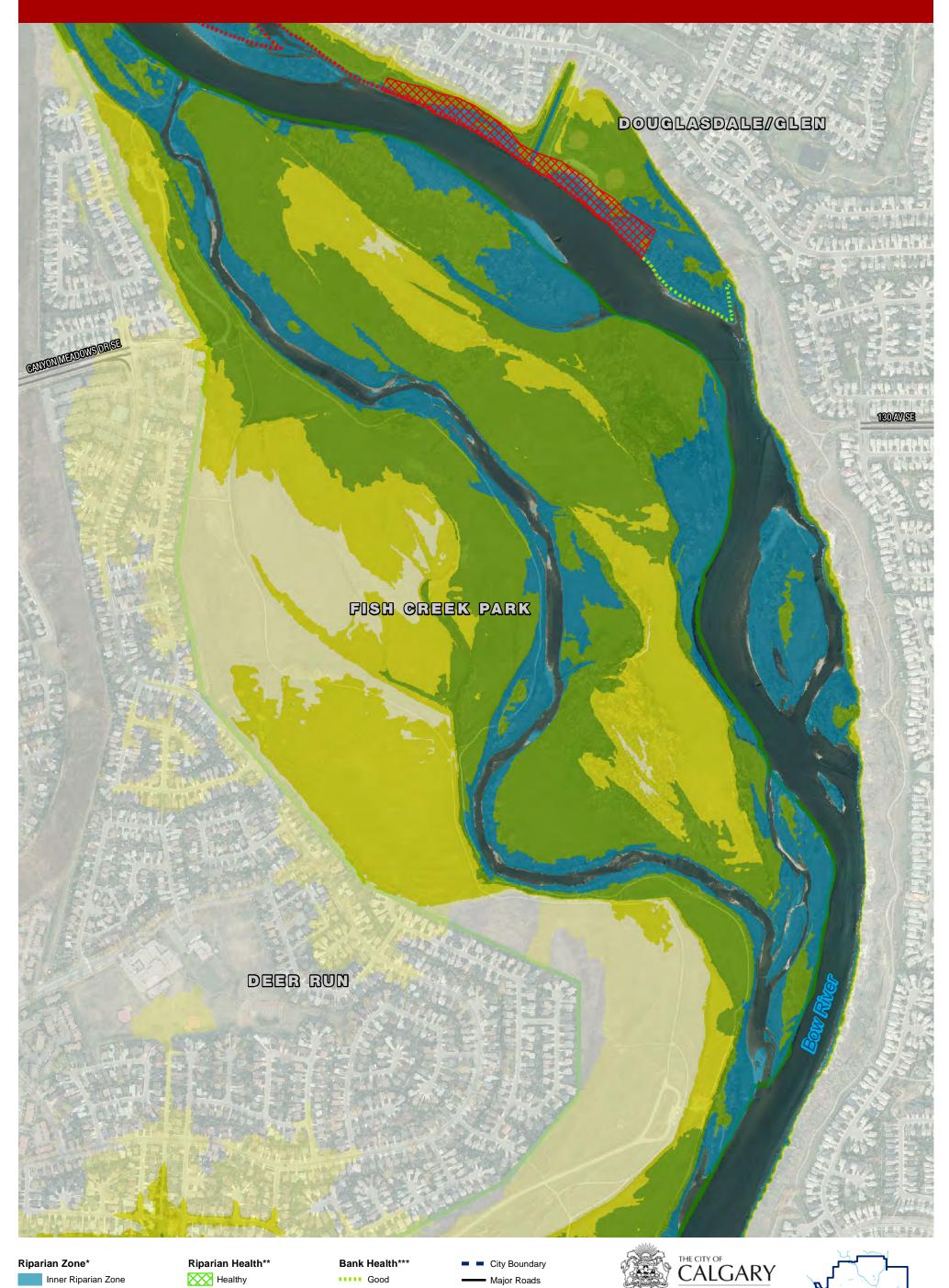
(ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)



Metres





Major Roads

Streams

Fish Creek Provincial Park

0 50 100

200

Metres

300

400

<del>⊢</del> Rail

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

Unhealthy

Healthy, but with Problems

Moderate

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

Poor



## Nose Creek Watershed Partnership Setback\*\* Future Urban Development Flood Fringe Industrial Flood Extent - 100 Year (Nose Creek/West Nose Creek) Institutional Outer Riparian Zone Boundary Major Infrastructure Streams Mixed Use \*Note that ER setbacks for lower order streams are not mapped as they were out of the project scope Major Roads Residential HH Rail Parks, Recreation and Public Education \*\*Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15% Golf Course 0 50 100 200 300 400 Metres



Sanitary Main (>600mm diameter) Water Main (>400mm diameter) - - Siphon Pipeline River Crossing Locations Mater / Waste Water Treament Plants

Existing Storm Retrofit Pond

Storm Main (>900mm diameter)

Possible Location of Storm Retrofit Pond Existing Storm Pond

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs) ■ Bank Erosion Hotspot

Paved Trails **Gravel Trails** 

= Bridge Buildings Parks (Maintained Turf Areas)

City Boundary

Major Roads

HH Rail

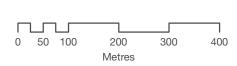
Streams

Fish Creek Provincial Park

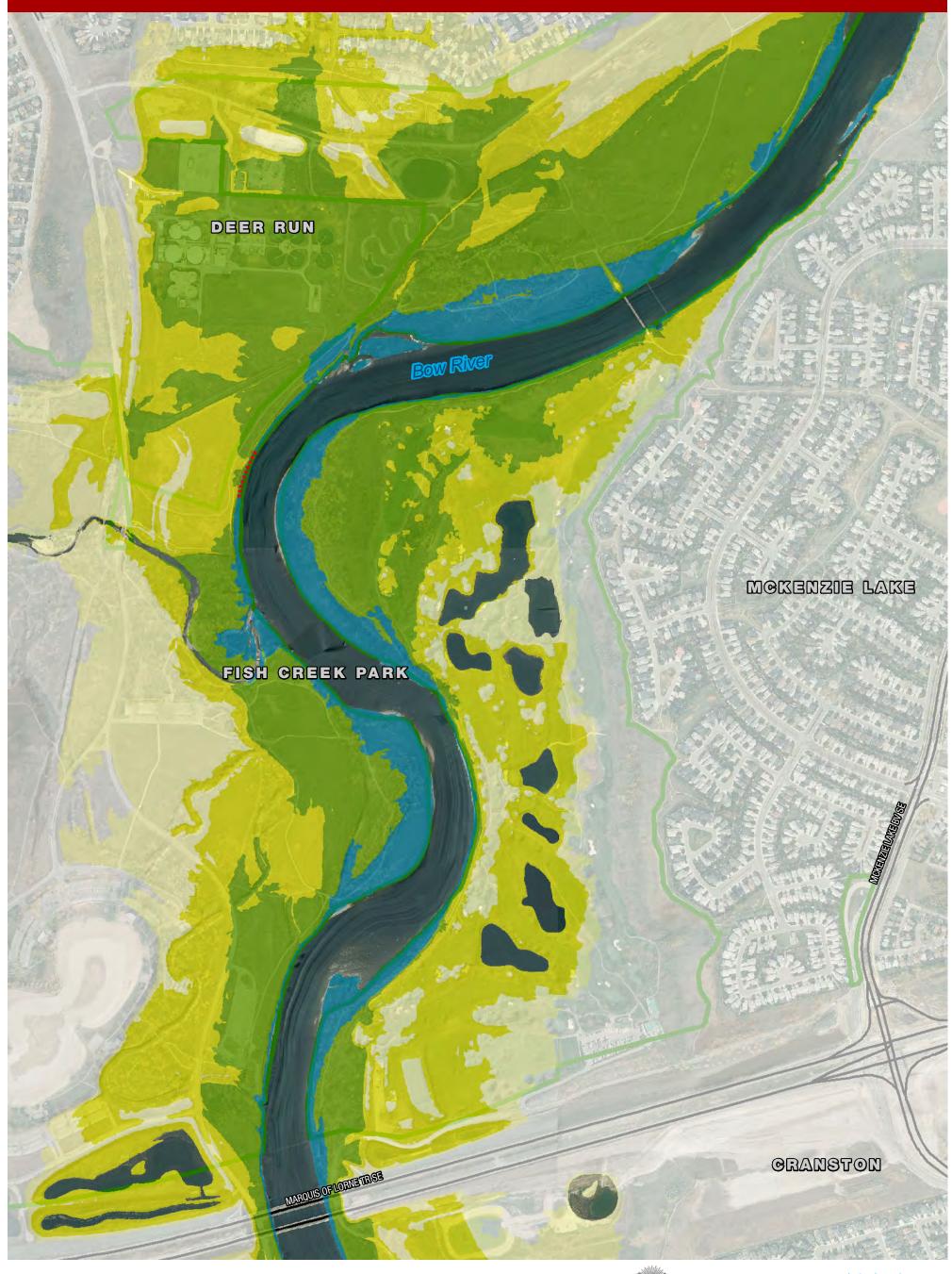
(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy













Riparian Zone\*

Inner Riparian Zone Middle Riparian Zone Outer Riparian Zone

Potential Outermost Riparian Zone

Riparian Health\*\*

Healthy

Healthy, but with Problems Unhealthy

\*\*Based on field studies of sampled riparian polygons only

### Bank Health\*\*\*

Good Moderate

Poor

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

### City Boundary Major Roads



Fish Creek Provincial Park

0 50 100

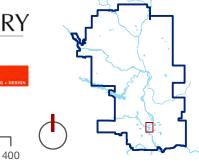


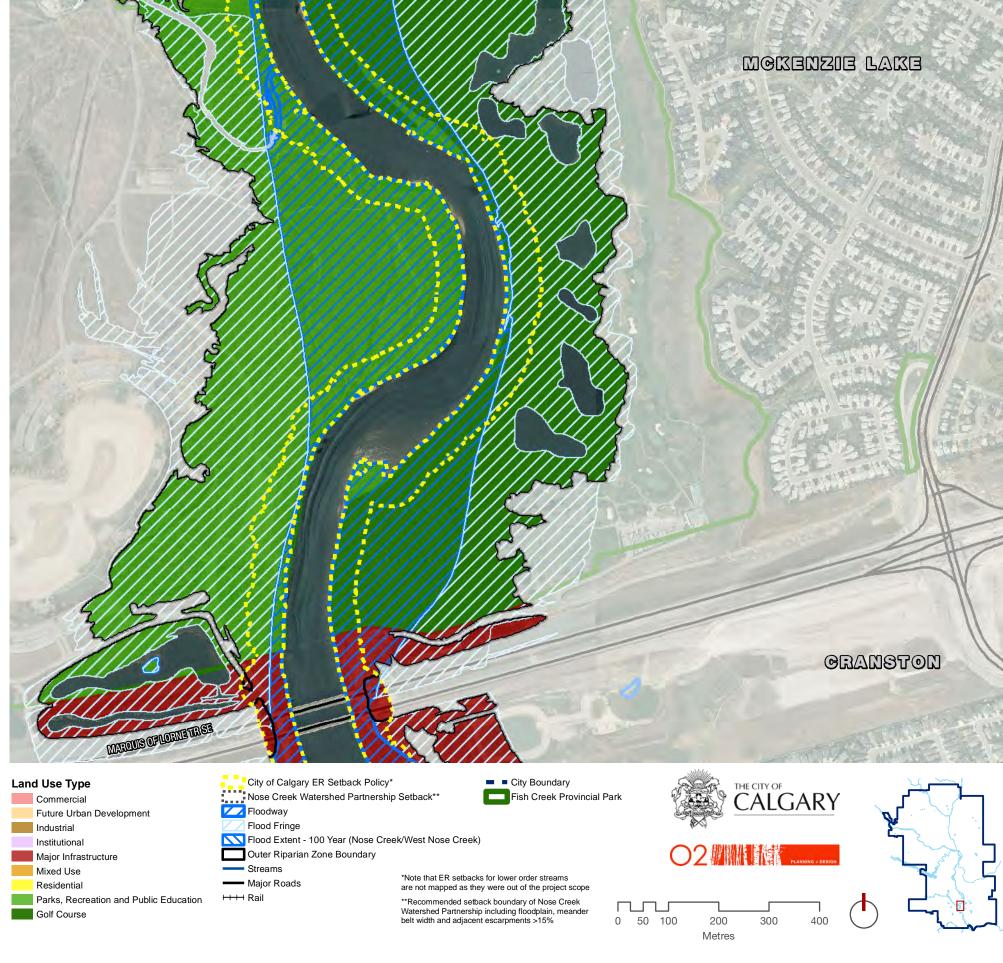


300

200

Metres







Storm Outflow Location Stormwater Lift Station

Storm Main (>900mm diameter)

Sanitary Main (>600mm diameter)

Water Main (>400mm diameter)

- - Siphon

Pipeline River Crossing Locations Mater / Waste Water Treament Plants

Existing Storm Retrofit Pond

■ Bank Erosion Hotspot

Existing Storm Pond Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs)

Possible Location of Storm Retrofit Pond

Streams Fish Creek Provincial Park

Paved Trails

**Gravel Trails** 

Parks (Maintained Turf Areas)

= Bridge Buildings

City Boundary

Major Roads

HH Rail

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy

(See Theme 2-Land and Regulatory Issues)





0 50 100 200 300 400 Metres



### Riparian Zone\*

Middle Riparian Zone Outer Riparian Zone

Potential Outermost Riparian Zone

Healthy, but with Problems

Unhealthy

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

Poor

Streams

Fish Creek Provincial Park

0 50 100



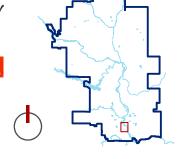


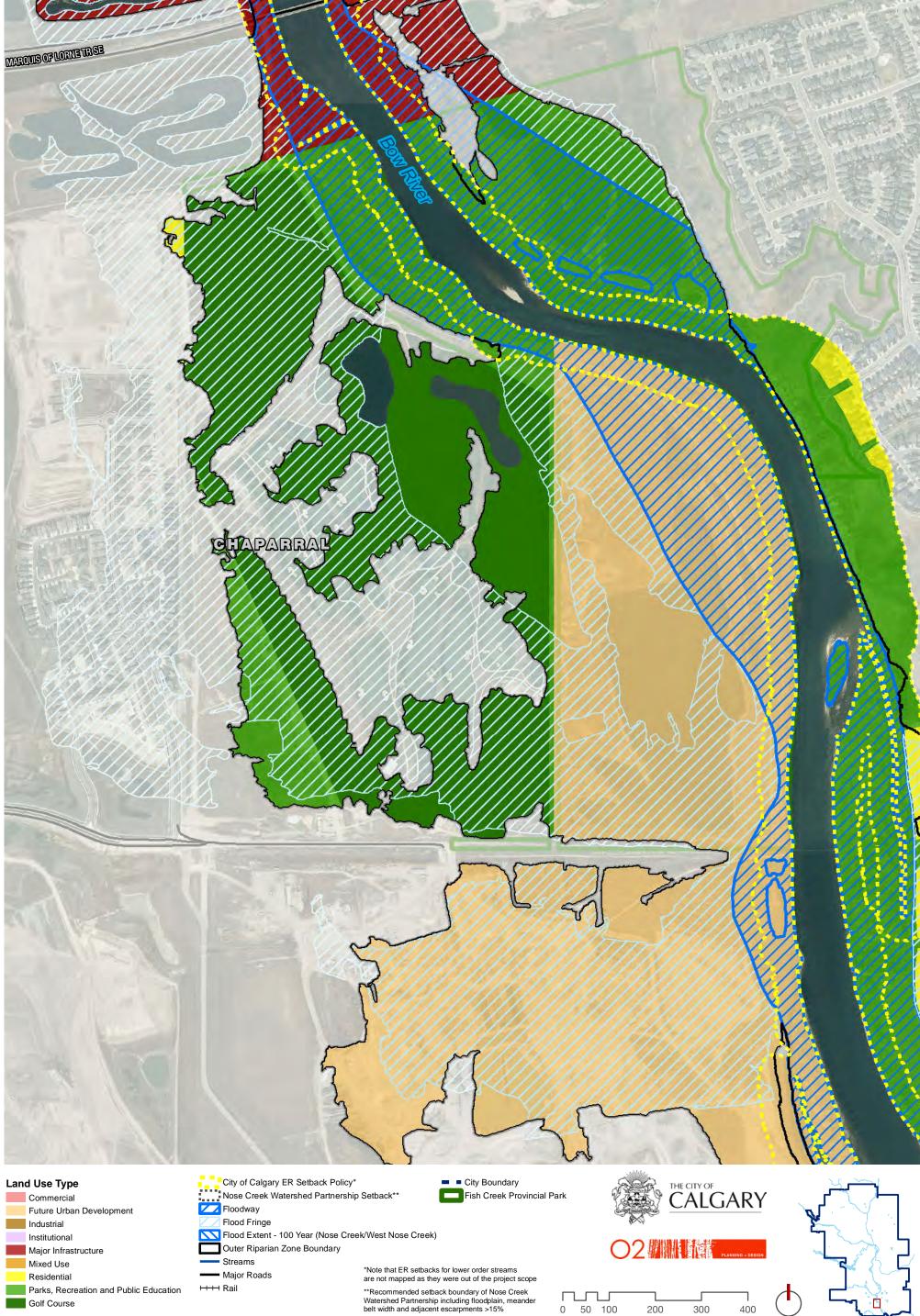
300

400

200

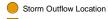
Metres





Metres





Stormwater Lift Station Storm Main (>900mm diameter)

Sanitary Main (>600mm diameter)

Water Main (>400mm diameter)

- - Siphon Pipeline River Crossing Locations

Mater / Waste Water Treament Plants Existing Storm Retrofit Pond

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs) ■ ■ Bank Erosion Hotspot

Paved Trails

**Gravel Trails** 

= Bridge

Buildings
Parks (Maintained Turf Areas)

City Boundary

Major Roads

HH Rail

Streams

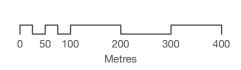
Fish Creek Provincial Park

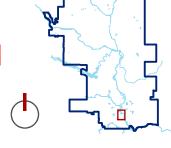
The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy



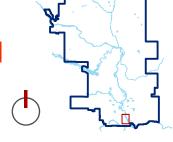






\*Variable Width Riparian Model Outputs

sampled riparian polygons only



200

Metres

300

400



Storm Outflow Location Stormwater Lift Station

Storm Main (>900mm diameter)

Sanitary Main (>600mm diameter) Water Main (>400mm diameter)

- - Siphon Pipeline River Crossing Locations

Mater / Waste Water Treament Plants

Existing Storm Retrofit Pond Possible Location of Storm Retrofit Pond

Existing Storm Pond

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs) ■ Bank Erosion Hotspot

Paved Trails **Gravel Trails** 

= Bridge

Buildings Parks (Maintained Turf Areas)

City Boundary

Major Roads

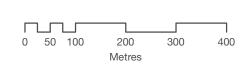
HH Rail

Streams Fish Creek Provincial Park The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy













Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

\*\*Based on field studies of sampled riparian polygons only

Healthy, but with Problems

Healthy

Unhealthy

### Bank Health\*\*\*

Good

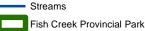
Moderate

Poor

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

City Boundary Major Roads

++++ Rail Streams



0 50 100



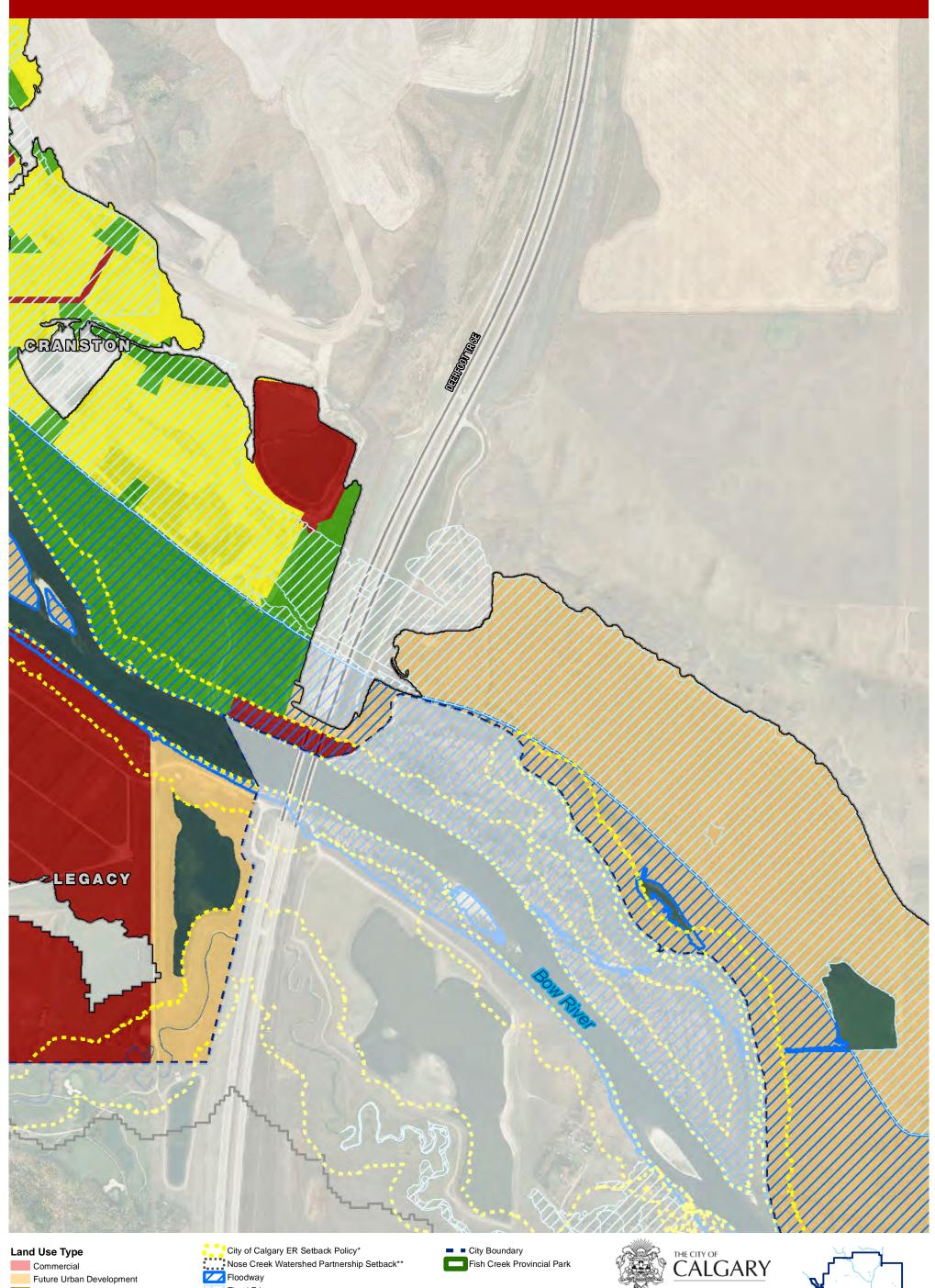


300

200

Metres





## City of Calgary En Selback 1 01107 Nose Creek Watershed Partnership Setback\*\* Floodway Flood Fringe Industrial Flood Extent - 100 Year (Nose Creek/West Nose Creek) Institutional Outer Riparian Zone Boundary Major Infrastructure Streams Mixed Use \*Note that ER setbacks for lower order streams are not mapped as they were out of the project scope Major Roads Residential HH Rail Parks, Recreation and Public Education \*\*Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15% Golf Course 0 50 100 200 300 400 Metres



Sanitary Main (>600mm diameter) Water Main (>400mm diameter) - - Siphon Pipeline River Crossing Locations Mater / Waste Water Treament Plants Existing Storm Retrofit Pond

Storm Main (>900mm diameter)

Possible Location of Storm Retrofit Pond Existing Storm Pond

Existing Bank Infrastructure (e.g., Rip Rap, Retaining Walls, Weirs) ■ Bank Erosion Hotspot

Paved Trails

**Gravel Trails** = Bridge Buildings

Parks (Maintained Turf Areas)

City Boundary

Major Roads

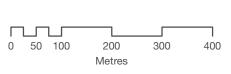
HRail

Streams Fish Creek Provincial Park

(i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy









## RIPARIAN AREA - LOCATION AND FUNCTION **BOW RIVER 19**



### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

## Riparian Health\*\*

Healthy

Healthy, but with Problems

Unhealthy

\*\*Based on field studies of sampled riparian polygons only

### Bank Health\*\*\*

Good Moderate

Poor

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

## City Boundary

---- Major Roads

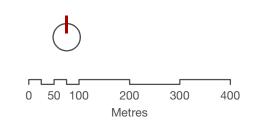
⊢++++ Rail

Streams











Commercial

Industrial

Institutional

Future Urban Development

Mixed Use

Residential

Golf Course

Parks, Recreation and Public Education

## LAND AND REGULATORY ISSUES **BOW RIVER 19**



Major Roads

City Boundary

HHH Rail



Outer Riparian Zone Boundary

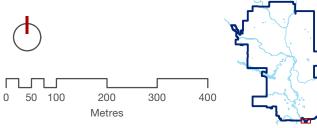
Nose Creek Water Management Plan Setback \*\*

Floodway

Flood Fringe

Flood Extent - 100 Year (Nose Creek/West Nose Creek) Fish Creek Provincial Park





<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

# RIPARIAN AREAS MAP PROJECT

## EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS **BOW RIVER 19**



Stormwater Lift Station Storm Main (> 900mm diameter) ■ ■ Bank Erosion Hotspot Sanitary Main (>600mm diameter) Water Main (>400mm diameter) Pipeline River Crossing Locations Water / Waste Water Treatment Plants

- Paved Trails Gravel Trails ==== Bridge Buildings Existing Storm Retrofit Pond Parks (Maintained Turf Areas) Possible Location of Storm Retrofit Pond

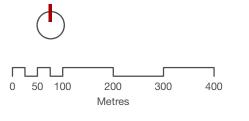
△ Candidate Flood / Erosion Control Projects

Major Roads HH Rail Fish Creek Provincial Park The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
 (ii) City ER setback policy boundary,
 (iii) Nose Creek Watershed Partnership recommended setback policy









# RIPARIAN AREA - LOCATION AND FUNCTION BOW RIVER 20



### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

## Riparian Health\*\*

Healthy

Healthy, but with Problems

Unhealthy

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots 
\*\*Based on field studies of or steep valley slopes with sampled riparian polygons only limited riparian habitat

### Bank Health\*\*\*

City BoundaryMajor Roads

⊢++++ Rail

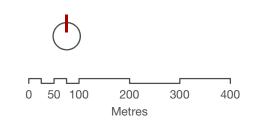
Good
Moderate

Poor

Streams
Fish Creek Provincial Park









# RIPARIAN AREAS MAP PROJECT

Future Urban Development

Industrial

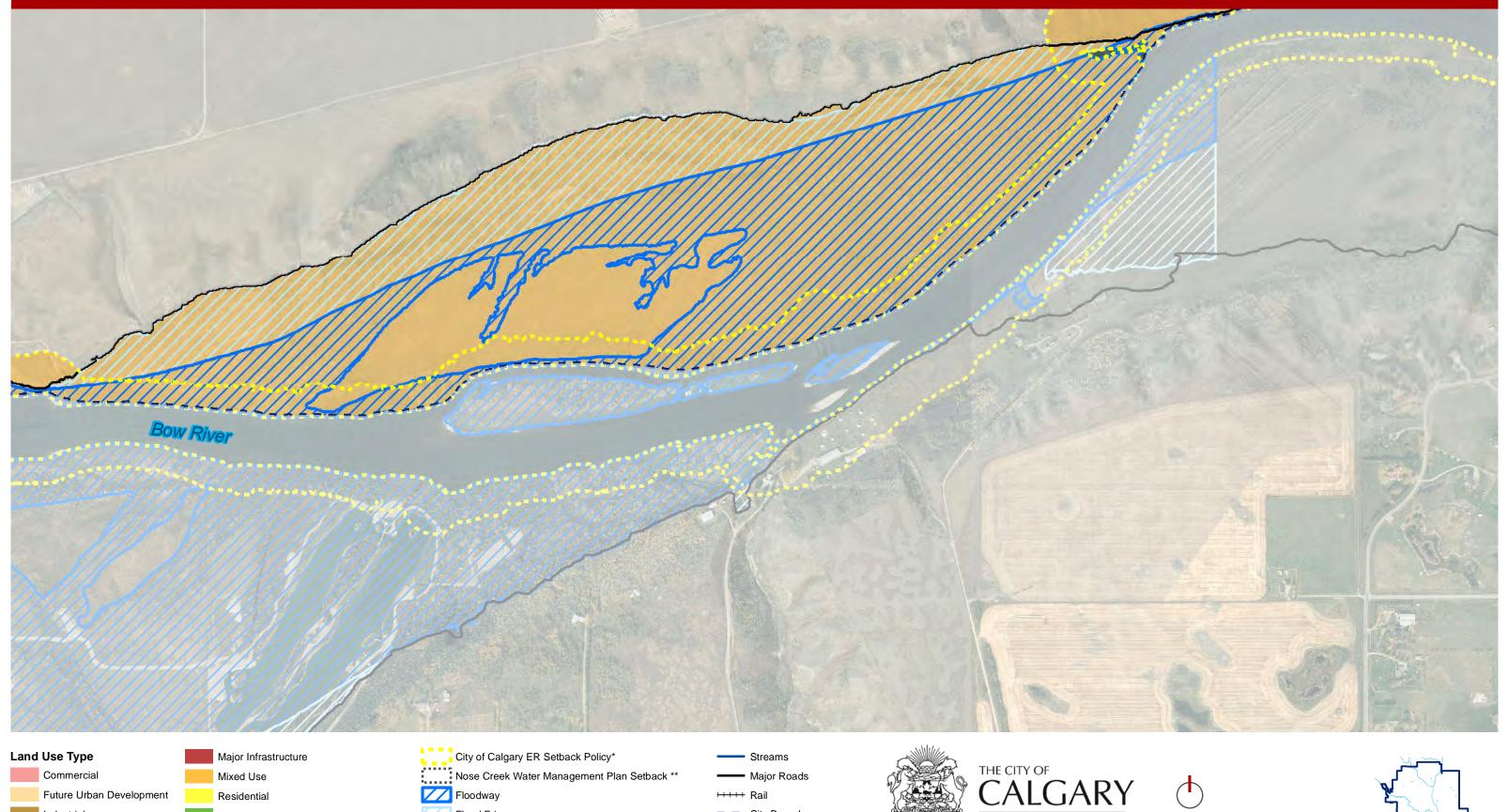
Institutional

Residential

Golf Course

Parks, Recreation and Public Education

## LAND AND REGULATORY ISSUES **BOW RIVER 20**



HHH Rail

City Boundary

Fish Creek Provincial Park

\*Note that ER setbacks for lower order streams are not mapped as they were out of the project scope

Outer Riparian Zone Boundary

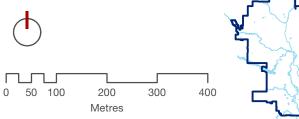
Flood Extent - 100 Year (Nose Creek/West Nose Creek)

Floodway

Flood Fringe

<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%





# RIPARIAN AREAS MAP PROJECT

## EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS **BOW RIVER 20**



Storm Main (> 900mm diameter) ■ ■ Bank Erosion Hotspot Sanitary Main (>600mm diameter) Water Main (>400mm diameter) Pipeline River Crossing Locations Water / Waste Water Treatment Plants

Existing Storm Retrofit Pond

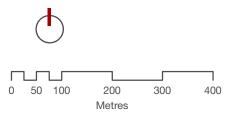
Possible Location of Storm Retrofit Pond

- Paved Trails Gravel Trails ==== Bridge Buildings Parks (Maintained Turf Areas)

△ Candidate Flood / Erosion Control Projects

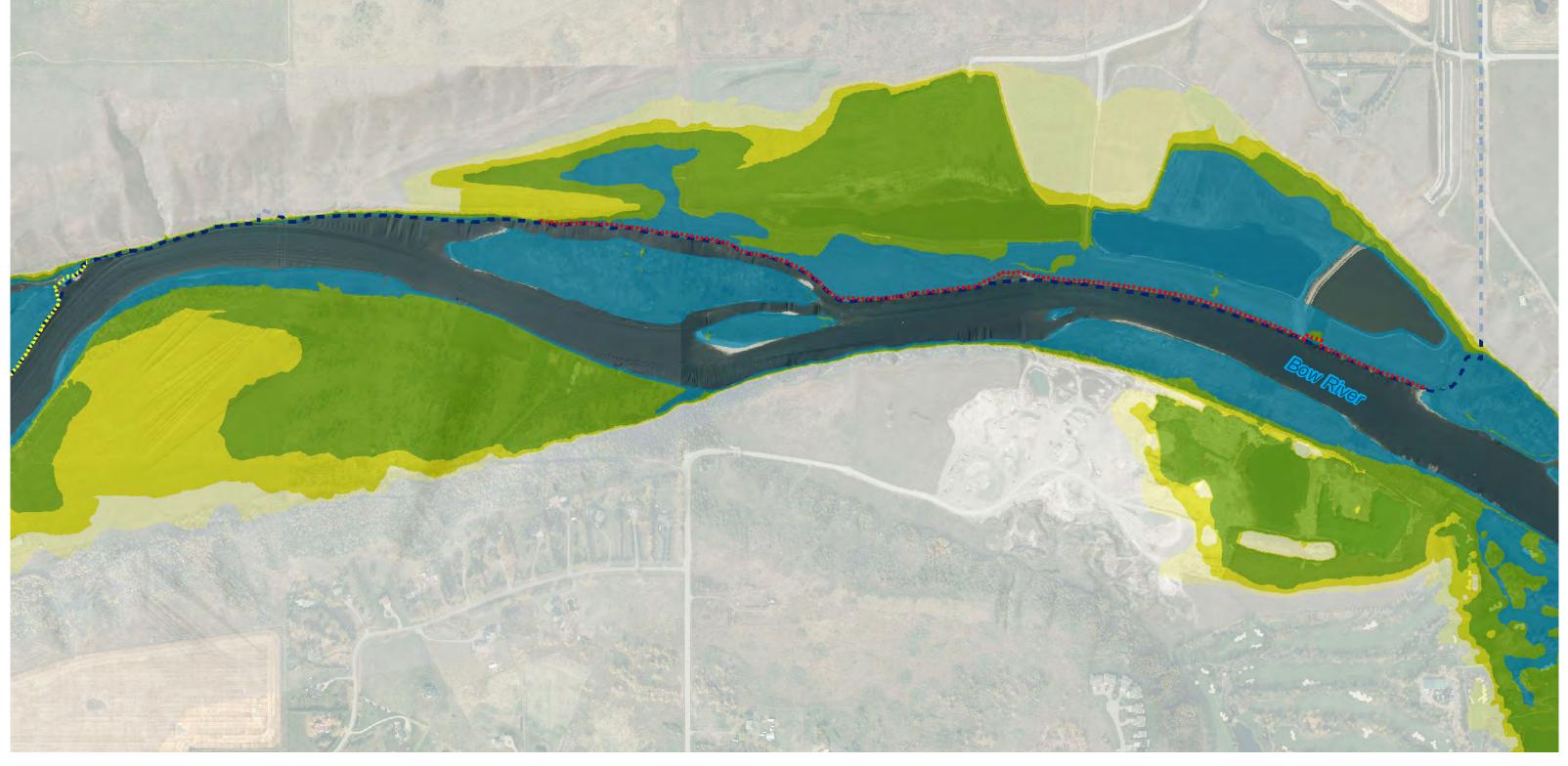
Major Roads HH Rail Fish Creek Provincial Park The non-masked area is based on the greater of: (i) outer riparian zone of the variable width model, (ii) City ER setback policy boundary, (iii) Nose Creek Watershed Partnership recommended setback policy







## RIPARIAN AREA - LOCATION AND FUNCTION **BOW RIVER 21**



### Riparian Zone\*

Inner Riparian Zone

Middle Riparian Zone

Outer Riparian Zone

Potential Outermost Riparian Zone

Riparian Health\*\*

Healthy

Healthy, but with Problems

Unhealthy

\*\*Based on field studies of sampled riparian polygons only

Bank Health\*\*\*

Good

Moderate Poor

\*\*\*Based on field studies of major rivers / creeks, excluding private residential riverfront lots or steep valley slopes with limited riparian habitat

City Boundary

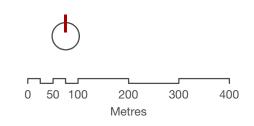
---- Major Roads ⊢++++ Rail

Streams

Fish Creek Provincial Park









Future Urban Development

Industrial

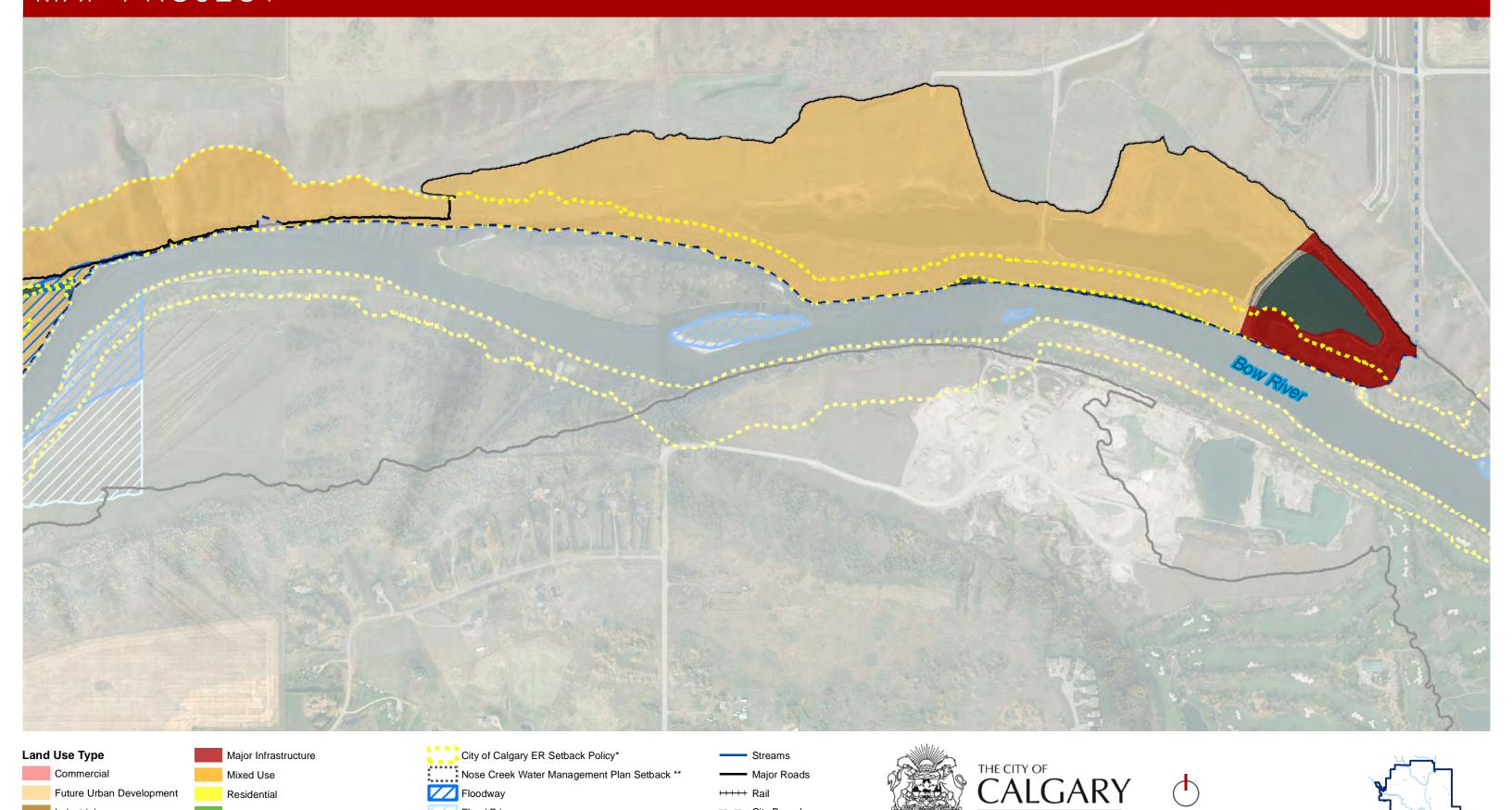
Institutional

Residential

Golf Course

Parks, Recreation and Public Education

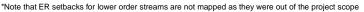
## LAND AND REGULATORY ISSUES **BOW RIVER 21**



HHH Rail

City Boundary

Fish Creek Provincial Park



Outer Riparian Zone Boundary

Flood Extent - 100 Year (Nose Creek/West Nose Creek)

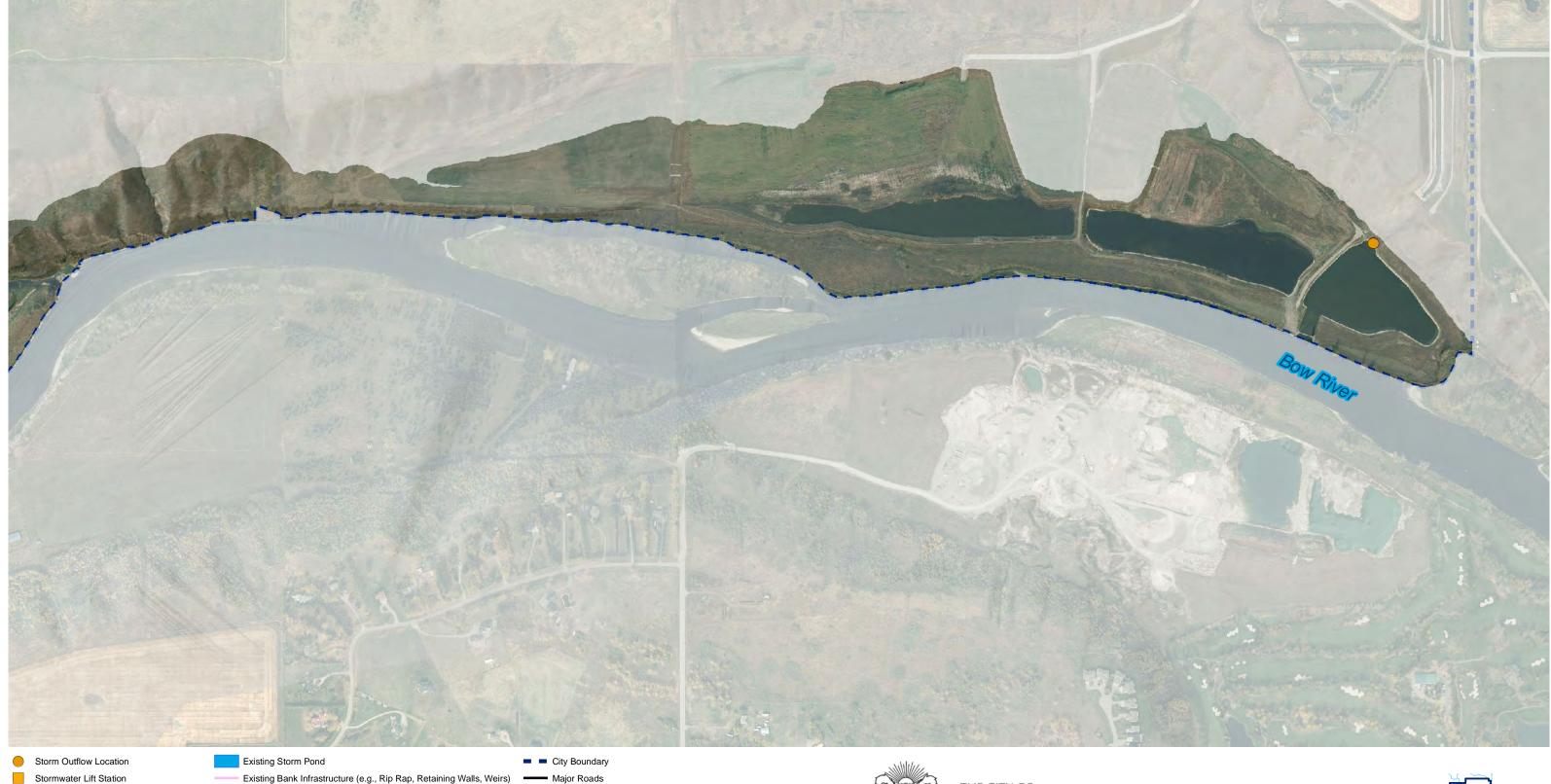
Floodway

Flood Fringe

<sup>\*\*</sup>Recommended setback boundary of Nose Creek Watershed Partnership including floodplain, meander belt width and adjacent escarpments >15%

# RIPARIAN AREAS MAP PROJECT

# EXISTING INFRASTRUCTURE AND POSSIBLE IMPROVEMENTS BOW RIVER 21



Storm Outflow Location

Stormwater Lift Station

Storm Main (> 900mm diameter)

Sanitary Main (>600mm diameter)

Water Main (>400mm diameter)

Siphon

Pipeline River Crossing Locations

Water / Waste Water Treatment Plants

Existing Storm Pond

Exist Storm Pond

Existing Storm Pond

Exist Storm Pond

Exist Storm Pond

Exis

Existing Storm Retrofit Pond

Possible Location of Storm Retrofit Pond

Candidate Flood / Erosion Control Projects
Paved Trails
Gravel Trails
Bridge
Buildings
Parks (Maintained Turf Areas)

Weirs) Major Roads

HHH Rail
Streams
Fish Creek Provincial Park

The non-masked area is based on the greater of:

(i) outer riparian zone of the variable width model,
(ii) City ER setback policy boundary,
(iii) Nose Creek Watershed Partnership recommended setback policy





