9.0 APPENDIX I:

HISTORICAL RESOURCES OVERVIEW

PROCEDURES, TABLES AND MAPS

1.0 INTRODUCTION

The historical resources screening process identifies potential conflicts with existing or predicted historical resources site locations, determines what forestry practices will harm them and provides mitigative heritage prescriptions to prevent or minimize the chances of damaging these resources. The following two sections outline the Historical Resources Overview procedures for those areas covered by heritage potential models and historical databases as well as those that do not. The screening results for each development are presented in tabular format in the final section of this Appendix. These tables include the legal land description, forecasted ground impacts, heritage potential, and, finally, the heritage prescription required for each proposed development. The screening results are presented by individual operating unit and are accompanied by GIS maps that display the developments over the digital heritage potential model (where available) and in association with local hydrological, geological and/or topographic features.

2.0 HISTORICAL RESOURCES OVERVIEW PROCEDURES (HERITAGE POTENTIAL MODEL)

This Historical Resources Overview (HRO) procedure is used for areas that maintain historical resources management infrastructure (*i.e.*, Digital heritage potential model and various historical databases). The procedure consists of a number of interrelated components, each of which provides specific data for managing historical resources concerns for a particular development or operation. The overall approach involves predicting where heritage resources are located, determining what industry practices will harm them and devising a solution to prevent or minimize the chances of damaging those resources.

2.1 PROCEDURES FOR REVIEWING HERITAGE RESOURCES

Archaeology is primarily a site-specific activity and, therefore, ideally suited to a planning scenario where more information is available on the timing and location of specific developments, such as tree harvesting or road building activities. The overall approach involves predicting where heritage resources are located, determining what forestry practices will harm them and devising a solution to prevent or minimize the chances of damaging those resources.

2.1.1 COMPONENT 1: HERITAGE POTENTIAL MODEL AND HERITAGE DATABASES

A digital model of heritage potential is created using quantifiable environmental and geographic information that is manipulated statistically using a geographic information system. In generating this model, forestry companies provided digital data sets of elevation, classified hydrology, soils, surficial geology, forest cover and ecological/landform unit data. The model creates a continuous representation of high, moderate and low heritage potential. The raster version of the model is accurate to plus or minus 25 m. Since each sub-hectare of land in the modelled area has a potential value assigned to it , it is possible to predict fairly precisely where heritage sites are most likely to occur and take remedial action as required. The model is currently resident on the Alberta Western Heritage GIS.

In addition to the model data set, there are numerous data sets that are used for managing historical resources in the FMA. These are:

1) Archaeological Sites Inventory Database, updated to May 2004 from data supplied by ACD. The estimated accuracy of individual site locations is plus or minus 100 metres.

2) Historic Sites Inventory Database.

3) Historic Trails and Cabins Databases, compiled from late 19th and early 20th century forest reserve and sectional description maps of the Whitecourt/Lesser Slave Lake Region. The estimated accuracy

of these trails is plus or minus 500 metres. Since these cabin locations have not been relocated, their estimated locational accuracy is plus or minus 1000 metres. More cabin information is expected to be forthcoming from other sources in the future, with nominal locational accuracy of plus or minus 100 metres or better.

4) Palaeontological Sites Inventory Database

5) Significant Sites Database

2.1.2 COMPONENT 2: HERITAGE RESOURCE IMPACT STUDY

Each industry practice is graded according to a specially devised impact measurement scale called CRICS (Cultural Resources Impact Classification System). Since CRICS values for a given forestry practice change under different environmental conditions (*i.e.,* organic soil cover, soil firmness, landform slope), the CRICS classification and a CRICS calculator are used to determine what industry practices will pose a threat to heritage resources in high and moderate heritage potential zones. A summary of the CRICS system is included here for reference. A graphical summary of CRICS is shown in Figure 1.

CRICS DESCRIPTION

CLASSIFICATION 0 - NO IMPACT

Activities which do not physically disturb the surface organic or subsurface mineral soil of a site, or implanted features within its boundaries, are defined as Class 0 impacts. People walking across well-consolidated unfrozen ground or vehicles driving across frozen or snow-covered ground would produce Class 0 impacts, if surface features were not disturbed.

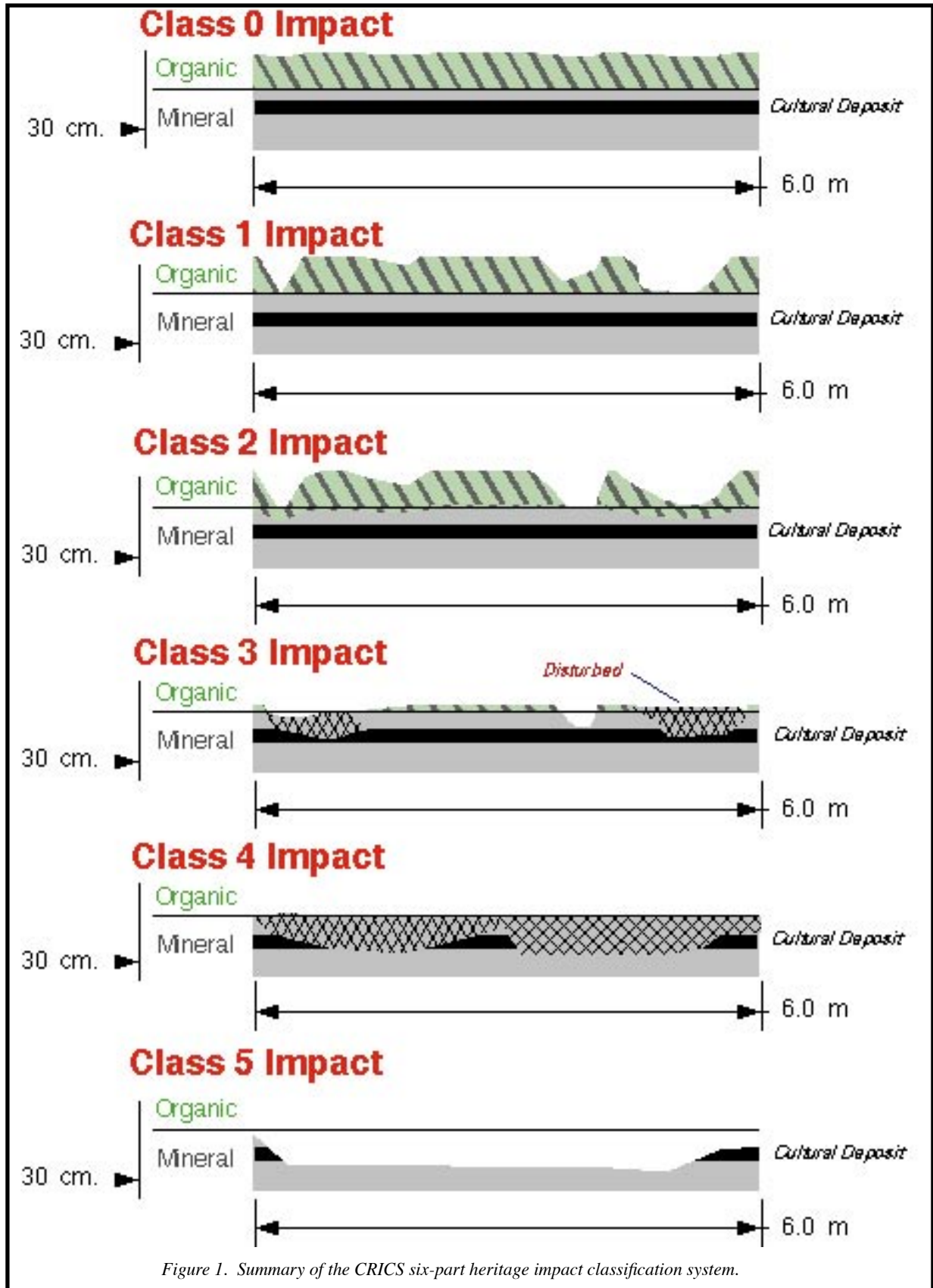#### CLASSIFICATION 1 - INCIDENTAL CONTACT

This classification would apply to any activity which impacted the organic surface of a site but did not disturb the integrity of the subsurface mineral soil. If the organic, "protective" soil layer is removed, either mechanically or naturally, exposing but not disturbing mineral soil, this would be considered Class 1 impact. Such impacts are found when vehicle ruts are left in the organic layer of a forest soil, or minor compaction occurs in mineral soils, which later rebounds. Also, if the ground is firmly frozen, certain normally high impact forestry practices can produce only Class 1 impact. Forest fires can naturally remove the organic horizon. However, although mineral soil is often exposed, natural forest revegetation tends to rebury it before it becomes significantly weathered.

Unburied, implanted features, such as structure remnants, foundation remains or fire pit rocks, may be pushed partially into the ground or shifted in place, but not physically moved. This kind of Class 1 impact can occur when a wheeled or treaded vehicle passes over unfrozen forest floor or when vehicles bump up against a standing structure.

CLASSIFICATION 2 - INCIDENTAL IMPACT

This kind of impact is present when the organic soil layer of the forest floor is removed, exposing and compressing the mineral layer which can contain a cultural deposit. However, even if the cultural layer is located on the surface of the mineral layer, artifacts are not regularly moved out of position. Occasional gouging or the organic layer may reveal some mineral soil, which may also be noticeably compacted or rutted.

This kind of impact is seen in its most severe form when larger naturally downed trees are pushed aside or into piles by a bladed vehicle such as a loader or a bulldozer working in dry unfrozen conditions.

Figure 1. Summary of the CRICS six-part heritage impact classification system.

Repeated traffic by lighter vehicles over soft ground, causing incipient rutting, can also produce the worst form of Class 2 impact. Human occupation activity can also cause Class 2 impact by eroding away the mineral horizon, and preventing a new, protective organic layer from forming over the mineral soil.

For implanted surface features, Class 2 impact results in standing structures being knocked askew, or exposed foundations receiving superficial surface damage.

CLASSIFICATION 3 - REGULAR IMPACT

This class of impact applies to any kind of activity which regularly exposes and disturbs the mineral soil layer. Not infrequently, if the mineral soil contains artifacts and features, they will also be disturbed. In such cases, artifacts would be found scattered locally over the disturbed area, but with some indication of where they came from on the site. Buried features may be found in place, but deformed and truncated (partially removed).

Class 3 impacts can occur in the course of some wood cutting operations, particularly on soft, poorly consolidated ground. However, most Class 3 impacts are related to ground clearing activities and some ground preparation for silviculture. The former occurs where uneven ground is smoothed over to produce a level surface or where tree roots are pulled up, leaving pits in the forest floor. This is especially prevalent where cutblock access trails and wood landings have been constructed. For silviculture, certain shallow ground treatments, usually involving organic removal or displacement (screefing), can produce Class 3 impact.

Implanted surface features will generally be knocked over or partially dismantled, although their original location can usually be determined. Culturally modified features on trees may be partially obliterated.

CLASSIFICATION 4 - SEVERE IMPACT

When the near-surface mineral soil is completely modified, with virtually no evidence of the original surface present, this would be considered a Class 4 impact. Artifacts from a shallow buried archaeological site would be found scattered about with no indication of where they came from within an impacted area. No recognizable buried features would be encountered, and no reconstructible subsurface stratigraphy would be present indicating where the artifacts originated.

An example of this impact would be wholesale clearing of a forest floor for the preparation of a wood landing or truck turnaround, or clearing and landscaping of terrain for a stream crossing or a raised grade road. Skidding of wood over rough terrain with a thin organic overlay can also result in significant Class 4 impact in a cutblock.

Although Class 4 impacts are usually related to activities of small areal extent under wood procurement operations, they are probably the most common kind of disturbance associated with silviculture ground preparation, ground treatments such as disc trenching and v-plowing would create this kind of impact over a large area.

Implanted surface features, such as structural remains, would be entirely moved out of position at this level of impact. Remnants would probably appear in debris piles. Culturally modified trees would be removed, but features would still be visible and the tree could be linked to its original location.

CLASSIFICATION 5 - TOTAL IMPACT

If all or portions of a potential or known archaeological site contained within the mineral soil horizon are removed, this would constitute the most serious kind of impact, Class 5. Class 5 impact would occur

if parts of a site were entirely removed by road grade construction, mining activity (gravel quarrying) or completely obscured through burial by fill. The latter case is not the same as *capping* a site, which in certain instances can be considered a form of protective mitigation.

Class 5 impact occurs naturally as well. An archaeological site situated on the edge of a river bank or on the margin of a lake can be eroded away and the exposed materials either washed downstream or inundated, producing class 5 impact. Erosion is not a requirement, however. If all or parts of a site are rendered completely inaccessible by flooding, theoretically this would be considered Class 5 level disturbance, especially if the site were made permanently inaccessible. Entirely separating a culturally modified tree from its location, and being unable to determine where the original location was, would be equivalent to Class 5 impact.

CRICS Summary

As can be seen in the examples, the preceding six classes of impact apply to all kinds of heritage resources, including historic and ethnographic sites. Although they are broad in scope, each class represents a threshold of resource integrity which directly relates to its amenability to archaeological interpretation. From a forestry management perspective, the goal is to keep the interpretability threshold as high as possible by inflicting less severe impacts. For example, a critical shift in management focus occurs between Class 2 and Class 3 impact. In the case of the former, archaeological remains become exposed and are in peril of degrading rapidly, especially if subjected to more impact from artificial or natural agents. However, the resources can be stabilized, or data recovered, without significant loss if particular management strategies are employed. At the Class 3 level, loss will be inflicted, and the management focus changes from protection to pre-impact mitigative recovery of data (if feasible), or avoidance.

2.1.3 Component 3: Heritage Management Plan

Once the heritage potential of a given area is known (using information from the heritage potential model and other heritage databases) and various levels of industry impacts are understood, a heritage management prescription is produced for every development. For planning purposes, an objective method is used to determine what level of archaeological inspection is required for each development that is proposed. The CRICS classification scheme and the digital heritage potential classification have been designed to produce results in combination to provide direct prescription evaluations. This is done by adding the calculated CRICS score of a proposed practice in an area (using the heritage impact calculator equations) to the heritage potential score (obtained from the heritage potential model) and the effect of other heritage data sets, yielding a coefficient that is equated to a recommended heritage mitigation approach, referred to as a heritage prescription.

Alberta Community Development generally applies three basic heritage prescriptions to any kind proposed development taking place in the province. These are:

No Assessment- The proposed development will not require any form of archaeological field inspection. Development may proceed.

Pre-Impact Assessment- The proposed development requires an archaeological field inspection before it can proceed.

Post-Impact Assessment- The proposed development requires an archaeological field inspection after it has been completed. Development may proceed.

In this historical resources management strategy a more comprehensive set of prescriptions is applied

because detailed data regarding operation impacts and local heritage potential are available for heritage screening, enabling informed decisions to be made about specific practices that can be taken in particular situations. In this regard, the fundamental change to the ACD heritage prescriptions is the differing application of field inspections to developments that exceed Class 3 impacts when heritage potential warrants.

Five heritage mitigation procedures (prescriptions) have been defined, all related to field inspection of developments by a qualified archaeologist. They are:

1) <u>No Assessment-</u> The proposed development will not require any form of field inspection. Development may proceed up to Class 5 impacts.

3) <u>Post-Impact Audit-</u> This kind of inspection will take place after a development has been completed. Impacts up to Class 5 are permitted, such as road construction or cutblock harvesting and reclamation.

4) <u>Moderate Impact Assessment-</u> This kind of archaeological inspection takes place after a development has been initiated but before development impacts exceed CRICS Class 3. In a forested environment, this will normally permit trees to be harvested and removed from a cutblock or proposed right-of-way. Any other kind of development, such as ground preparation, in-block road/wood landing reclamation, or road grade construction, which normally exceeds Class 3 impact, will not proceed until this inspection has been completed. Note that unstumped roads and drag trails, commonly found in cutblocks, do not normally exceed Class 3 impacts.

5) <u>Low-Impact Assessment-</u> This kind of archaeological inspection takes place after a development has been initiated but before development impacts exceed Class 2. In a forested environment, this will permit trees to be harvested, skidded and piled (under normal operating conditions) but the wood cannot be removed from a cutblock or proposed right-of-way until an archaeological inspection is undertaken. Any other kind of development, such as wood piling (at a wood landing as opposed to a wood deck), wood loading, in-block road/wood landing reclamation, road grade construction or road stumping, which normally exceed Class 2 impact, cannot proceed until this inspection has been completed.

6) <u>Pre-Impact Assessment-</u> This kind of archaeological field inspection will take place before any kind of development can proceed. Pre-impact inspection procedures are used in the HRIA process administered by ACD. Under normal circumstances, the boundary of the development must be defined with markers (stakes or ribbons) to ensure that all of the proposed development area can be examined. Pre-Impact inspections of road right-of-ways will be the most common employment of this level of archaeological work. Also, any development creating Class 4 or 5 impacts which approaches within 100 m of a registered archaeological site will normally require a Pre-Impact Assessment.

Heritage Prescription	HPI
No Assessment	0-5
Post-Impact Heritage Audit	6
Moderate-impact Assessment	7
Low-impact Assessment	8
Pre-impact Assessment	9

Table 1.   Applying the Heritage Prescription Index to individual prescriptions.

In order to apply these prescriptions to a development based on its predicted level of impact and potential for harbouring heritage resources, the prescriptions are indexed on a scale referred to as the Heritage Prescriptions Index (HPI). This index is shown in Table 1.

2.2 APPLYING THE PRESCRIPTIONS

During the initial overview, heritage prescriptions for any development are determined automatically by evaluating the heritage potential of the area where a development takes place with its predicted level of impact. The two values are combined, then correlated with an indexed scale of heritage pre-scriptions. Heritage potential for each hectare (or sub-hectare) of land is obtained from the heritage potential model GIS file and the companion databases. The model is divided into three categories: low, moderate and high potential. These three categories are equated to three heritage potential coefficients (low=0, moderate=2, high=3). Development impacts are evaluated using CRICS coefficients, ranging in value from 0 to 5. The prescription index for each development is calculated by adding the Heritage Potential Coefficient (HPC) of the area the development is taking place to the corresponding CRICS coefficient of the development, yielding a number between 1 and 8 (Table 2).

The companion databases for existing historical resources also provide input to the evaluation by rais-

Heritage Pot	HP Coeff	CRICS Level	CRICS Coeff	HP Index	Heritage Prescription
Low	0	No Impact	0	0	No Assessment
Moderate	2	Incidental Contact	1	3	No Assessment
High	3	Incidental Impact	2	5	No Assessment
Low	0	Severe Impact	4	4	No Assessment
Moderate	2	Total Impact	5	7	Moderate-impact Assessment
Moderate	2	Severe Impact	4	6	Post-impact Heritage Audit
High	3	Total Impact	5	8	Low-impact Assessment
Moderate	2	No Impact	0	2	No Assessment
Low	0	Total Impact	5	5	No Assessment

Table 2.   Calculating Heritage Prescriptions using Heritage Potential and CRICS values under various conditions.

ing the heritage prescription index for a given area, depending upon their influence. Their affect on the index is as follows:

Historical Boundary-   Any development located within the recorded boundary of a registered historic site will have its HPI raised by one level.

Historic Trail -   All historic trails, because of their poor locational accuracy, have their

widths buffered to 500 metres. Any development which falls within 500 m of a trail will have its HPI raised by one level.

<u>Historic Cabins</u> -   Historic cabins that have been recorded from old historical maps will have a 250 m buffer applied to them. Any development which falls within a buffered cabin zone will have its HPI raised by one level.

<u>Registered Archaeological Site</u> - Any development located within a 250 m radius of a registered site will have its HPI raised by one level. Any development located within a 100 m radius will have its HPI raised by an additional two levels (total of 3 levels).

<u>Palaeontological Sensitivity</u> - The CRICS approach does not apply to such heritage resources, so it is not appropriate to change the HPI index of a designated palaeontological zone in order to trigger some sort of enhanced management response. A standard procedure of having the consulting archaeologist being alert to the presence of exposed fossiliferous deposits will be followed, unless ACD directs that a qualified palaeontologist be retained.

<u>Significant Heritage Zone</u> - Based on a provincially maintained listing, a locality with this designation will have its heritage prescription index value raised to 9, ensuring that any kind of development in a zone of this type will receive a detailed pre-work overview assessment by an archaeologist. This is in accordance with the policy of ACD. ACD has acknowledged that these defined zones may be subject to revision over time as the heritage potential of a particular "sensitive" area is investigated more fully. It is possible that more detailed evaluation may determine the sensitive zone was defined too broadly. In such cases it may be possible to undertake various kinds of development within the broadly defined zone, providing that actual sensitive zones are flagged for avoidance.

The effect of these resources on calculation of heritage prescripitons is shown in Table 3.

Development Prescription	SHA	RAS	HT	HC	HPC	CRICS	HPI	Heritage
Road A	0	1	0	0	2	5	8	Low-impact Assessment
Road B	0	3	0	0	3	5	9+	Pre-impact Assessment
Road C	0	0	0	0	2	5	7	Moderate-impact Assessment
Road D	0	0	0	0	0	5	5	No Concerns
Block A	9	0	0	0	0	2	9	Pre-impact Assess-

Table 3.   *Example of Heritage Prescription desgination for roads and cutblocks based on presence of various heritage conditions and anticipated impact. SHA=Sensitive Heritage Area; RAS=Registered Archaeological Site; HT=Historic Trail; HC=Historic Cabin; HPC=Heritage Potential Coefficient (from model or manual evaluation); CRICS=Cultural Resources Impact Classification System (impact level); HPI=Heritage Potential Index.*