



Preliminary Landfill Site Suitability Report

March 2004

Prepared by
Guam Environmental Protection Agency
in association with
Department of Public Works

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PRELIMINARY LANDFILL SITE SUITABILITY REPORT

Guam Environmental Protection Agency
& Department of Public Works
March 2004

I. INTRODUCTION

The Ordot Dump Consent Decree (U.S. District Court, Territory of Guam, Civil Case No. 02-00022) requires the Department of Public Works (DPW) to submit a list of a least three (3) potential landfill sites to the U.S. Environmental Protection Agency (U.S. EPA) and Guam Environmental Protection Agency (Guam EPA) within 30 days of the Consent Decree (CD) entry date. Furthermore, the CD requires that DPW complete a site selection Environmental Impact Statement (EIS) within 300 days of the entry date. This screening document is a record of the preliminary site suitability screening process undertaken by DPW and Guam EPA to identify potential landfill sites for which the EIS will be prepared.

II. METHODS

The DPW, with technical assistance from Guam EPA, undertook a review of available records, performed a geographic information system (GIS) data overlay analysis, and conducted site reconnaissance visits to develop an initial potential landfill site list. Exclusionary criteria were developed using the Municipal Solid Waste Landfill Location Restrictions specified in the Guam Solid Waste Disposal Rules and Regulations (GARR Title 22, Div. 4, Chapter 23) and other guidelines to pare the initial potential landfill site list down to the Preliminary Area List (PAL). The PAL sites were then scored using screening criteria to determine the top three (3) sites.

The following informational methods were used to gather data to develop the screening criteria used in this process.

- A. Available Records Review.** This review involved, but was not limited to, examining public easement; land ownership; land use and zoning; past, current and potential future development; various map sets; and published planning guidance documents.
- B. GIS.** The GIS data layers used for the Exclusionary Criteria mapping exercise were topography, roads, highways and residential/commercial structures, Northern Aquifer and groundwater protection zones, watershed boundaries, 100-year flood prone zones, and historic/scenic resources.
- C. Site Reconnaissance.** Site reconnaissance work involved, but was not limited to, observations on geology, hydrology, verification of topographic features, wetlands, access, land use activities, potential footprint configurations, available soil material, and flora and fauna considerations. Recent landfill siting efforts included at least 20 reconnaissance trips to approximately 10 sites over the past three years.

III. SITE SCREENING ASSUMPTIONS

The following set of assumptions was developed to characterize the scope of various geographical, engineering, environmental, operational, and socio-political considerations for site suitability screening. A good understanding of the pragmatic realities of modern sanitary landfill siting, design, and operations is important to focus on the important limitations and opportunities of development.

- A. Aquifer Areas.** Guam's northern aquifer area is designated as a sole source aquifer providing nearly 80% of all drinking on Guam. *Guam's Groundwater Protection Zone (GPZ) and other potential groundwater producing areas were eliminated from consideration for a landfill.*

- B. Minimum Design Area.** It was determined that a sanitary landfill with a life span of thirty (30) to fifty (50) years (with recycling and other waste diversion systems) would require a minimum of *100 acres* with a total vertical profile at closure of not less than 20 meters. This design factor would account for adequate buffers between surrounding land use activities, on-site facilities such as an office, maintenance building, recycling and/or materials recovery facility (MRF), special waste cells, cover material stockpiles, treatment works, scales, parking, and similar requirements.

- C. Development Costs.** Direct development costs were not calculated or examined as a direct factor for this screening process, but the screening criteria values that were applied include indirect cost considerations. One example would be the criteria values given to the requirement for site access, whereby shorter road development distances score high and long distance road development or improvements score low.

- D. Pollution Discharges.** All sanitary landfill liners can be expected to leak to a certain extent within the landfill system. In the unlikely event that leachate were to discharge to the environment, it would be far easier to control the environmental consequences in a clayey soil and surface waters than it would be for porous water-bearing rock, such as the island's karst areas south of the northern aquifer. In the unlikely event of catastrophic landfill structural failure, it would be far better to have relatively flat buffer areas at the perimeter of the landfill. *The potential for pollution discharges to surface waters is an important but not a critical siting factor.*

- E. Previously Identified Landfill Sites.** More than twenty potential landfill locations have been examined, applying a variety of levels of scientific rigor and technical criteria over the past twenty years. None of the previously identified sites were evaluated based on current (as early as 1992) RCRA Subtitle D location restrictions and design requirements. The two partial exceptions to this statement are the sites which were evaluated by the *Draft Environmental Impact Statement – Solid waste Management Facility for the Island of Guam, 1995* (J.C. Tenorio and Associates, Inc., Consulting Engineers). These two sites (Malaa and Guatali) were selected from previous studies from the 1970s and 1980s and evaluated using RCRA Subtitle D

requirements. This Screening process represents the first ever effort to apply Subtitle D requirements to the identification of potential landfill sites throughout Guam.

- F. Landfill Fires.** Modern sanitary landfills are engineered and operated to practically eliminate the potential for large and uncontrollable fires. Daily cover and cell designs will minimize most accidental fires. *The potential for landfill fires and the associated air pollution impacts are not a significant siting factor.*
- G. Landfill Odor.** Modern sanitary landfills are engineered and operated to nearly eliminate the potential for nuisance odors. Daily cover and operational cell designs will contain most all but the acceptable on-site odors associated with the immediate working face. *Nuisance odors are not a significant siting factor; however, where the option exists, landfills should be developed downwind (prevailing direction) of populated areas.*
- H. Land Use.** Any new landfill facility must be located on property zoned for “M-2” Heavy Industrial (§61309, 21 GCA). Because M-2 zoned properties are extremely limited throughout the island, actual zoning was not a significant siting factor. However, site proximity to existing land uses and zones was considered to be a significant issue in that a new landfill should be located sufficiently distant (at least 1/4 mile) from highly populated areas and near low-density zones.
- I. Property Ownership.** Siting a landfill on government owned land would be ideal, all other factors considered. However, the inventory of government of Guam land in central to southern Guam is far too limiting as an exclusionary criterion. Siting on federal lands was not considered a high priority option given the higher levels of uncertainty related to timely acquisition and the fact that the military has not indicated a willingness to deem portions of existing land inventories as excess.

IV. LOCATION RESTRICTIONS

This section describes each Subtitle D location restriction taken directly from the Solid Waste Disposal Rules and Regulations, 22 GAR Div. 4, Chapter 23.

- A. Airport Safety.** Municipal Solid Waste Landfills (MSWLFs) must not pose a bird hazard to aircraft.
- B. Floodplains.** Ensure that the location does not restrict the flow of the 100-year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste so as to pose a hazard to human health and the environment.
- C. Wetlands.** Ensure that MSWLFs are not located in wetlands, unless the owner or operator can demonstrate to the Administrator of Guam EPA and U.S. EPA that a practical alternative that does not involve wetlands is unavailable; the construction and operation will not cause or contribute to violations of the Clean Water Act, Water

Quality Standards, Endangered Species Act of 1973, Marine Protected, Research, and Sanctuaries Act of 1972, and will not cause or contribute to significant degradation of wetlands, and steps have been taken to attempt to achieve no net loss of wetlands.

- D. Fault Areas.** New MSWLFs shall not be located within 200 feet (60 meters) of a fault that has had displacement in Holocene (recent) time unless the owner or operator demonstrates to Guam EPA and U.S. EPA that an alternative setback distance of less than 200 feet (60 meters) will prevent damage to the structural integrity of the MSWLF and will be protective of human health and the environment.
- E. Seismic Impact Zones.** New MSWLFs shall not be located in seismic impact zone, unless the owners or operator demonstrates that all containment structures, including liners, leachate collection systems, and surface water control systems are designed to resist that maximum horizontal acceleration in lithified (rock from unconsolidated material) earth material for the site.
- F. Unstable Areas.** New MSWLFs located in an unstable area must demonstrate that engineering measurements have been incorporated into the design of the MSWLF. Determination of an unstable area is dependent of on-site or local soil conditions, on-site or local geologic or geomorphologic features, on-site or local human-made features or events.

V. EXCLUSIONARY CRITERIA

In addition to the siting restrictions, five Exclusionary Criteria were developed to serve as the first level screening effort to narrow the universe of potential land areas. Some of the criteria include regulatory requirements (i.e., location restrictions) represent prudent planning approaches given Guam's unique sub-regional geographic, infrastructure, and environmental constraints/opportunities for operating a landfill over a period of 30 to 50 years.

- A. Severe Topography.** Slopes in excess of 20% are considered too unstable for safe, cost effective landfill construction and phasing, especially when considering liner side slope design requirements.
- B. Northern Aquifer, Groundwater, and Karst Formations.** All significant water-bearing formations are ruled out as suitable locations.
- C. Southern Guam.** The southernmost area of Guam from roughly Inarajan Middle School to the KSDA Radio Towers (Agat) are ruled out for three major reasons: 1) Highway access is inadequate; 2) the potential impact on historic Inarajan; and 3) areas which possess scenic value (e.g., Agat to Merizo highway and Guam Territorial Seashore Park).

- D. Talofoyo/Ugum Watershed.** The Talofoyo/Ugum watershed includes two drinking water sources (Fena Reservoir and Ugum Water Treatment Plant) with good potential for new sources.
- E. Coastal Alluvial Plains, Major Rivers, and Bottom Lands.** The coastal alluvial plains, bottom lands and riparian zones are hydrogeologically unstable and do not allow for adequate buffers to surface water resources. These areas include 100-year flood plains, extensive wetlands and shallow water tables.
- F. Incompatible Land Uses.** Horizontal buffer distances of one-quarter to one-half mile were mapped to ensure land use compatibility buffers.
- G. Mapped Faults.** Mapped or observed faults were used to exclude potential areas within 200 feet of these features.

Two criteria **were not included** in the exclusionary list at this stage:

- H. Wetlands.** Wetlands were not applied at this exclusionary level of screening for two reasons. First, the National Wetlands Inventory is not accurate enough at the scale used to undertake the GIS mapping effort, and actual field observations by experienced individuals would provide adequate estimates of the order of magnitude impact on wetlands and wetland types.

Secondly, Guam's geologic makeup essentially requires making a decision between avoiding wetlands and ensuring that the landfill is not located over groundwater aquifers. While all efforts to minimize impact on wetlands will be taken in the design process and consideration is included in the ranking criteria, the fact that wetlands are virtually impossible to avoid rules it out as a realistic exclusionary criterion.

- I. Threatened and Endangered Species.** The only threatened and endangered species management area in the central to southern Guam region is the Guam Wildlife Refuge Overlay of Navy property. The overlay is confined to the Fena Watershed.

VI. EXCLUSION AREA MAPPING RESULTS

The Exclusionary Criteria mapping exercise included tabletop assessments, Geographic Information System (GIS) analysis, field observations, and verification of other data sets. Twelve (12) potential areas were identified as follows:

- Site 1 **Dandan** (Lot B-3-REM, Inarajan) — The Dandan site is best described as very large land parcel that includes a number of potential landfill locations spread over thousands of acres of relatively flat savannah grasslands in the headwaters of the Tinago River. The site is bound to the north by the Ugum River watershed, the west by headwaters of Fintasa River, to the east by several farm

plots and the Malojloj community, and to the south by more savannah and low hills in the headwaters of the Fensoi River. The nearest (within one mile) land use activity is the former NASA Tracking Station and several farm plots. The nearest residential area from some of the western portions of this site is approximately 1.5 miles away. Current land uses in and adjacent to the site include farming, communication facilities, off-road activities, and other wilderness recreation.

- Site 2 **Kurason Estates Subdivision** (Talofofo) — Eliminated from consideration based on current land use incompatibility.
- Site 3 **Baza Gardens Area** (Talofofo) — Eliminated from consideration based on incompatible land uses and karst geology.
- Site 4 **Kaskada** (Lot 100-2-R1NEW-R1, Yona) — The Kaskada site is located due west of the Windward Hills Golf Course and includes an area of at least 130 acres. Route 17 or Cross Island Road is due south and the Ylig River is to the north. The property is the location of a proposed 18-hole golf course resort.
- Site 5 **Cotal West** — This site has been identified as a potential golf course resort under the names “STT” or “Lake Agat.” The site under consideration is approximately 100 to 150 acres in size and is bordered by a farm plot to the south, an agricultural subdivision to the west, steep undeveloped areas to the north, and the Tarzan River to the east. The area has been extensively used for off-road recreation, including a motocross track, horseback riding, and similar activities. The site is also part of a near field view-shed for a newer community located across Route 17. Access would be from Route 17.
- Site 6 **Tenjo River Basin** (a.k.a. “Shell Oil Facility”) — Eliminated based on existing land use incompatibility.
- Site 7 **Malaa** (a.k.a. “Tenjo Vista Fuel Farm”) — Eliminated based on existing land use incompatibility.
- Site 8 **Majulosna** (a.k.a. “Tank Farm”) — This site is approximately 150 acres immediately to the west of the Leo Palace Resort Condominium structures. The best areas for a landfill at this site are potentially too close to the resort; however, adequate space may be available at the narrower western section. The area is used extensively by off-road and mountain bike enthusiasts. Access to this site would have to be constructed from the Leo Palace access road for a distance of nearly 1.5 miles, although no ravine or steep terrain is involved.
- Site 9 **Sabanán Batea** (a.k.a. “Dwight Look/Texas A&M University”; Lot 177-4-R2, Yona) — This 150 acre site is located in an area bounded by the MCI Satellite Facility and the northwestern corner of the Leo Palace Resort to the west, the Leo Palace access road to the north, a ridge immediately above the Pago River

to the east, and Pulantat, Yona to the southeast. The formerly proposed Guam First Green Golf Course is immediately south and within approximately 1500 feet, depending on the design footprint and the facility boundary. Prime access is available via the Leo Palace access road.

- Site 10 **Lonfit** (Lot 450-4, Asan) — This 80-100 acre site is located approximately 1900 ft. northwest of the Ordot Dump. The site is bounded by a GWA water reservoir to the southeast, pronounced rock outcrops flanked by the GPA high voltage power easement to the north, a ridge to the west, and is directly above the Lonfit River. A ridge to the east is above the Famja and Etton areas. The nearest residential structure is approximately 1500 feet to the southeast, or 2100 feet depending on the design location of landfill footprint. The minimum recommended horizontal separation between landfills and incompatible land uses is one-quarter mile or 1320 feet. It should be noted that a vacant residential subdivision exists as close as 1000 feet from the site. Access to the site is via Dero Drive or from Route 4. This site was proposed to be part of a large (950 acre) residential and golf resort community.
- Site 11 **Nimitz Hill COMNAVMAR** — Eliminated base on land ownership, area was not identified for return to Guam.
- Site 12 **Sasa River Basin** (U.S. Naval Station Sasa Fuel Farm) — Eliminated based on ownership and existing land use.

VII. PREVIOUSLY IDENTIFIED SITES

In this section we discuss sites identified as far back as *Draft Environmental Impact Statement – Solid Waste Management Facility for the Island of Guam* (1995, J.C. Tenorio and Associates, Inc., Consulting Engineers).

1. **Malaa, Piti** — Eliminated by slope exclusionary criterion.
2. **Guatali, Piti** — Eliminated by slope and geological exclusionary criterion.
3. **Ordot Dump Expansion** — Eliminated by slope and land use buffer exclusionary criteria.
4. **Lot 480, Agat** — Eliminated by slope and land use buffer exclusionary criteria.
5. **Pagachao, Agat** — Eliminating by slope exclusionary criterion as approximately 40% of the area involves slopes exceeding 20%.

VIII. SCREENING CRITERIA

The following nine (9) screening criteria were used to rate or score the six (6) PALs. Several criteria also include sub-criteria that were developed to qualify and provide some additional measure of certain technical considerations. These sub-criteria qualifiers were added to the weighted score. The criteria could also be described categorically by study discipline or scientific orientation. The categories are environmental (or natural resources), engineering, geology, land use, infrastructure, cost of service, and social. It is also worth noting that at this early stage in the site selection process the higher weighted criteria were scientific (i.e., environment, engineering, and geology) considerations.

1. Major/Minor Surface Water Features. Major surface water features (SWF) include perennial streams, rivers, and coastal features, including wetlands within or proximal to the landfill footprint that may be affected by landfill construction and/or operations. Minor SWFs include intermittent streams within or proximal to the landfill footprint. For the purpose of this landfill suitability criterion, a major wetland exhibits two or more wetland types such as emergent, forested, open water, and littoral wetlands in the landscape over areas larger than five (5) acres and/or potential impact of two or more relatively distinct wetland areas.

- Location requires only minimal modification of minor SWFs..... 4
- Location requires modification of two minor SWFs 3
- Location requires significant modifications of two or more minor SWFs 2
- Location requires engineering modification to reduce or eliminate significant threats to major surface water features..... 1

Water Quality Points (no weighting)

- S-1 High 1
- S-2 Medium 2
- S-3 Low 3

2. General Geology. Geology considerations include soils and substrate suitability for liner, cover and cell construction, proximity of mapped and observed faults, soil and substrate stability/structural integrity, the presence and viability of groundwater reservoirs, and other issues related to vertical and horizontal geometry.

- Area is geologically well-suited (minimal engineered modifications) to landfill development..... 4
- Area is adequately suited (commonly required engineered modifications) to landfill development 3
- Area is suited to landfill development only with significant engineering modifications 2
- Area is suited to landfill development but major structural challenges exist and unique design considerations are required..... 1

3. Access. Access considerations could factor significantly from the standpoint of both the relative costs of development, such as requirements for bridges, distance from existing highways and other structural elements, in addition to impacts associated with routing through existing incompatible land uses, especially residential areas and important scenic areas.

- Very difficult to develop and incompatible land use patterns 1
- Generally not difficult to develop/significant land use issues..... 2
- Developed or partially developed, requires improvements with minimal land use issues 3
- Adequate conditions and good land use compatibility 4

4. Available Capacity/Engineering Feasibility. The minimum design area required for a landfill is approximately 100 acres. Larger land areas are preferable in order to buffer adjacent land uses as well as to co-locate other waste management activities and to ensure a lifespan capacity of 30 years without substantial waste diversion programs. Nationally, landfill siting and planning efforts target lifespan capacities of 30 to 50 years with more emphasis toward 50 years and land areas of 500 to 1000 acres. Sites with gently sloping topographic features, including those with naturally occurring bowl shapes would be preferable.

- Parcel(s) is not less than 200 acres 3
- Parcel(s) is not less than 150 - 199 acres 2
- Parcel(s) is not less than 100 - 149 acres 1

Topographic Points (no weighting)

- Site involves excellent depressional and/or ridge containment features 3
- Site could easily be terra-formed to accentuate existing features and achieve a very good landscape fit..... 2
- Site has less than desirable topographic features, requires unique structural components 1

5. Proximity to Incompatible Developed Uses. This criterion refines the exclusion area criteria which calls for the landfill to be located at least one-quarter mile from adjacent land uses of significance (e.g., residential, commercial, recreation tourism, etc.). Locating the landfill more than a mile from populated areas would be ideal.

- Adjacent (1/4 mile) properties are residential in character and acquisition may be required 0
- Adjacent (1/4 mile) areas are undeveloped but zoned residential 1
- Located within 1/2 mile of a residential/commercial 2
- Located within 1 mile of residential/commercial areas 3
- Located in a remote (1 mile or more) and undeveloped area 4

View-scape Consideration Points (no weighting)

- Site involves intrusion on existing high value views..... 0
- Site may involve significant intrusion on future views..... 1
- Site will involve moderate future view impact..... 2
- Site is visually isolated or easily mitigated to minimize visual intrusions 3

6. Wetland Resources. The presence, type, and extent of wetlands is important from two perspectives. First, they are important surface water features that function to filter runoff, provide habitat, attenuate flooding, and provide for local and possible regional bio-diversity, among others. Second, the scope of impact necessary to site a facility has direct on and off-site mitigation implications, which can add considerable costs to project.

- Minimal wetlands (<2%)..... 3
- Moderate wetland areas observed (2 - 5%)..... 2
- Significant wetland areas observed (6-10%)..... 1
- Extensive wetland areas observed (>10%)..... 0

Note: Percent wetlands refers to the approximated facility footprint(s), less buffer and other undeveloped areas.

7. Available Soil Material. Generally, Guam’s volcanic soils are thought to be suitable for use as liner, intermediate cover, and eventual capping applications. The availability of soil on-site or in the immediate area of the proposed site is an important consideration.

- All of the larger volume components for liner, cell, and cover work is available onsite or adjacent to the site 3
- Significant (50-75%) amounts of the required soil material is available on or adjacent to the site 2
- Area soil availability and type is generally inadequate and significant material must obtained from distant off-site sources 1

8. Proximity to Recreational Areas and Parks. Sites which are located within or adjacent to parks and other important recreational or tourism related activities are less desirable; however, landfill activities can be visually buffered and operated to minimize intrusions. This criterion also includes minimal consideration for historic resources (easily observed or generally known), although any assessment of significant properties will be addressed in the Environmental Impact Statement (EIS) phase of siting.

- Consumes park land or displaces existing facilities 0
- Displaces rural/wilderness activities 1
- Negative impact anticipated on adjacent area uses 2
- Minimal impact on existing or planned recreation 3
- No discernable impact anticipated 4

9. Distance to the Center of Major Service Areas. Haul distance considerations include the added costs associated with average trip times, costs of additional support infrastructure, and impact on roadways. Although economies of scale and technology will mitigate distance considerations, it is generally desirable to make some consideration for shorter distances to major service areas. The center point of major service areas was determined to be the intersection of Routes 10, 16 and 8 in Barrigada.

- > 10 miles from the center point 1
- 9.99 - 5 miles from the center point 2
- <4.99 miles from center point 3

Table 1. Siting Criteria, Weighting & Sample Scoring

CRITERIA	WEIGHT	SITE 1 (Dandan)
1. Major/Minor Surface Water 2. General Geology 3. Available Capacity/Engineering	3	<i>4(3)+2 = 14 points</i>
4. Access 5. Incompatible Developed Uses	2	
6. Wetland Resources 7. Available Soil Material 8. Recreation Resources 9. Distance to Service Areas	1	

Sample scoring method: **4(3) + 2 = 14 points**

Criterion Value: 4

Weighting Factor: 3

Water Quality Points (not weighted): 2

IX. PRELIMINARY AREA LIST (PAL)

The PAL includes six (6) sites which were confirmed through a verification process including additional field reconnaissance work and knowledge of site conditions and land uses to ensure the exclusionary criteria mapping process was accurate in this regard. The six (6) sites were renumbered one (1) through six (6) as follows:

- Site 1 Dandan
- Site 2 Kaskada
- Site 3 Majulosna
- Site 4 Sabanan Batea
- Site 5 West Cotal
- Site 6 Lonfit

The six (6) sites were scored according to the values for each criterion. The scoring method employed two distinct processes. First, a consensus scoring process was encouraged for geology considerations and prescriptive criteria were applied for surface water quality designations, estimated acreage, and distance to service areas.

The second scoring process involved the application of individual perspectives for the more subjective criteria, such as recreation resource values, land use incompatibility, access, and view-scape values. It should be stressed that although certain expert interpretations were offered for group consideration, not all suggested scoring values were accepted. The EIS evaluation of each of the top three sites will refine and provide additional technical information to guide a final site selection decision.

This preliminary site suitability process was completed on February 23, 2004. All six (6) sites are presented in final rank order below. The three (3) sites submitted by the Screening Project Team for EIS evaluation (paragraph 9.a. of the Ordot Consent Decree) are listed as sites one through three (i.e., Dandan, Sabanan Batea, and Lonfit).

- 1. Dandan**
- 2. Sabanan Batea**
- 3. Lonfit**
4. Kaskada
5. West Cotal
6. Majulosna

Table 2. Site Suitability Criteria Rating Summary

Rater	Dandan	Kaskada	Sabanan Batea	Majulosna	West Cotal	Lonfit
1	62 (1)	38 (3)	45 (2)	25 (5)	31 (4)	38 (3)
2	62 (1)	36 (4)	52 (2)	29 (6)	33 (5)	38 (3)
3	58 (1)	31 (4)	44 (2)	26 (5)	31 (6)	35 (3)
4	64 (1)	36 (4)	52 (2)	33 (5)	37 (3)	37 (3)
5	65 (1)	40 (4)	49 (2)	32 (5)	38 (3)	37 (4)
6	64 (1)	36 (4)	52 (2)	32 (5)	37 (3)	37 (3)
Total Score	375	217	294	177	207	222
Average Score	62.5	36.2	49.0	29.5	34.5	37
Rank	1	4	2	6	5	3

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X. SCREENING PROJECT TEAM

The following individuals contributed to the collection, analysis, and coordination of information to support the overall screening process, including on-site reconnaissance and verification of site conditions from December 2003 to February 2004. The final site scoring effort involved six (6) raters, three (3) each from Guam Environmental Protection Agency and the Department of Public Works.

Cynthia Jackson, Rights of Way Supervisor, Department of Public Works (DPW)

Matthew Sablan, Planner IV, Department of Public Works

George Tydingco, Acting Chief of Operations, Department of Public Works

Michael James, Deputy Director, Department of Public Works

Christopher Lund, P.E., Chief Engineer, Guam Environmental Protection Agency

Randel Sablan, Chief Planner, Guam Environmental Protection Agency

H. Victor Wuerch, Hydrogeologist, Guam Environmental Protection Agency

Omar Damian, E.I.T., Special Projects Coordinator, Guam Environmental Protection Agency

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Map 1. Locations of the Top Six Potential Landfill Sites.

