VARIANCE REQUEST

Iowa Department of Natural Resources

1. Date:	December 19, 2006
2. Review Engineer:	Larry Bryant
3. Date Received:	December 8, 2006
4. Facility Name:	Edinburg Manor
5. County Number:	53 (Jones)
6. Program Area:	CP (Wastewater Construction)
7. Facility Type :	C05 (Biological Treatment)
8. Subject Area :	350 (Number of Lagoon Cells)
9. Rule Reference:	567-64.2(9)a
10. Design Stds Ref:	18C.5.1 (Number of Cells)
11. Consulting Engr:	MSA Professional Services
12. Variance Rule:	567-64.2(9)c

13. **Decision:** approved
Date: 12/20/06

14. **Appeal:**
Date:

15. Description of Variance Request:

Jones County is proposing to upgrade an existing single-cell controlled discharge lagoon by expansion to a 2-cell configuration with a new primary treatment cell. The system serves a county care facility (Edinburg Manor) currently including 30 occupants and 17 staff. The proposed design is to serve the maximum capacity of the facility (47 residents and 17 staff). In previous discussions and on a visit to the existing lagoon site, I have noted that the surrounding topography and site separation requirements limit the area available for expansion of the lagoon system. Section 18C.5.1 of the Iowa Wastewater Facilities Design Standards requires 3 cells for controlled discharge lagoon systems with a total surface area greater than one acre. A 2-cell system is proposed for a lagoon system with a total surface area of approximately 2 acres.

16. Consulting Engineer's Justifications

"On behalf of Jones County, Iowa, MSA Professional Services, Inc. is submitting this variance request to Section 18C.5.1 of the IDNR code. The variance is for the use of two cells for an installation with a total surface area greater than one acre. Based on our meeting, it was noted that a variance from this standard appears to be justified due to site limitations."

17. Department's Justifications

Recommend variance approval:

Most previous variances for two-cell configurations have been for unsewered communities. However, there are several reasons why approval of this variance is recommended:

1. The surrounding topography and utilization of the existing lagoon cell limit both the area available for lagoon construction and the lagoon configuration. The only practical site available for expansion of the lagoon system is on top of a hill approximately 35 feet above the existing lagoon elevation. This area is bounded by steep slopes to the east, west and south and by required site separation distances to a residence and public well to the north. The existing lagoon cell is bounded on all sides by steep slopes and drainage ways. Thus, the total area available for new construction at this site is fixed. A new primary cell must be constructed at the higher elevation to avoid the need for an intercell lift station. If this area were to be divided into two cells (a new primary and a new secondary cell) the area available for the new secondary cell would be small (due to maximum allowable BOD loading requirements for the primary cell) and difficult to construct. In addition, the total constructed treatment volume available would be reduced by the earth volume required for construction of the dividing berm.
2. A berm could be constructed to divide the existing cell into two secondary cells. However, this would reduce the treatment storage capacity of the existing cell by approximately 25%. The additional earthwork and construction

time associated with this alternative would also make continuity of operation during construction more difficult.

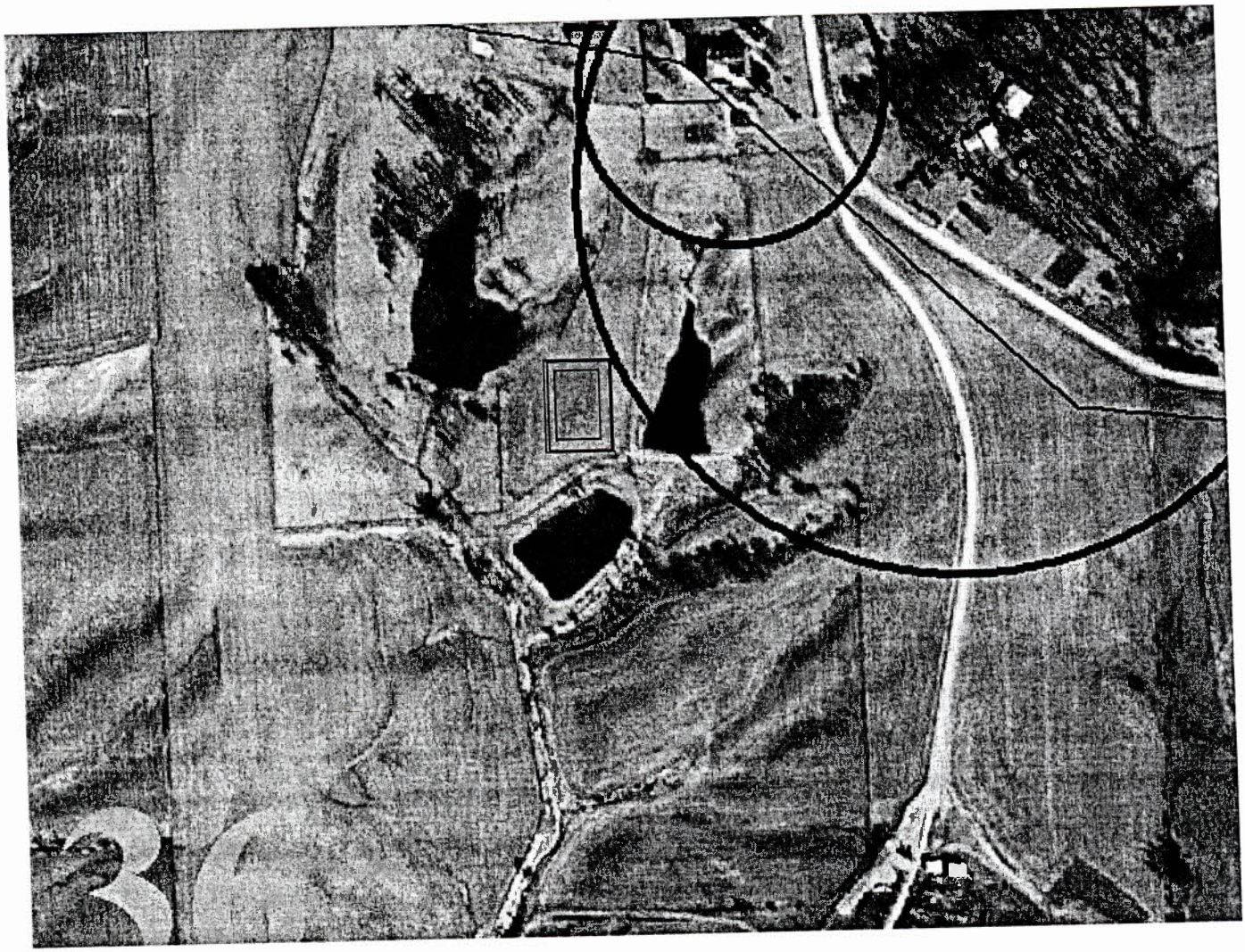
3. Due to lack of historical flow data, the design engineer has estimated the AWW_{180} for this facility using the maximum gpd values for a mental institution from 567 IAC 69 (175 gpd per resident plus 16 gpd per employee) for the maximum occupancy of the facility. 100 gpcd is the minimum allowable per capita loading in Chapter 14 of the Iowa Wastewater Facilities Design Standards. Thus, the design flow (8,700 gpd) is believed to be conservative. If the average secondary treatment sizing values in Chapter 69 were used for the AWW_{180}, the total surface area required by the standards for new construction would be less than 1 acre.

4. The proposed total storage volume is approximately 45% greater than the minimum 180 day requirement the volume at the estimated design flow. This is primarily due to the fact that BOD loading and not storage volume control the minimum allowable size of the proposed primary cell. A new primary cell of only 0.2 acres in combination with the existing cell volume would provide 180-days of detention, but would result in a BOD loading in excess of 60 lbs/acre/day. The proposed primary cell will have a detention time of 105 days while the existing (secondary) cell will have a storage time of 156 days (261 days total). The excess available storage will provide equivalent treatment and reliability as would otherwise be provided by a three-cell arrangement. The typical arrangement provided by a new 3-cell system provides only 60 days of storage with the primary cell out of service.

18. Precedents Used
City of Oyens - Approved 3/20/96 (sewered, 2.25 acres)
Harrison County - Approved 7/25/06 (unsewered, 4.8 acres)
City of East Peru - Approved 2/3/06 (unsewered, 2 acres)
Dietrick Mobile Home Park - Approved 8/25/06 (sewered, 4.27 acres)
City of Palmer - Approved 1/5/05 (unsewered, 2.97 acres)

19. Staff Reviewer: Date:

19. Authorized by: Date: 12/26/06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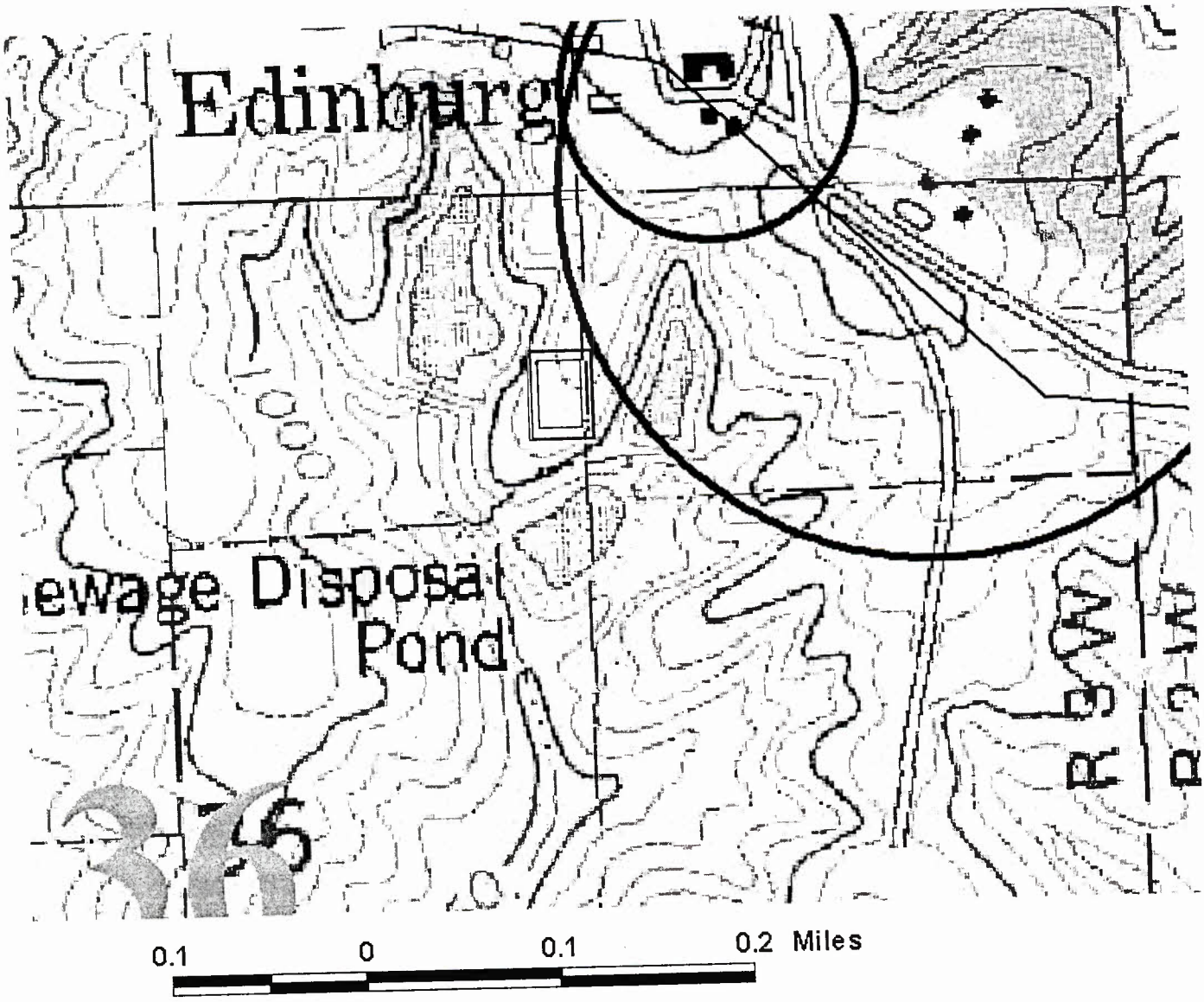
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