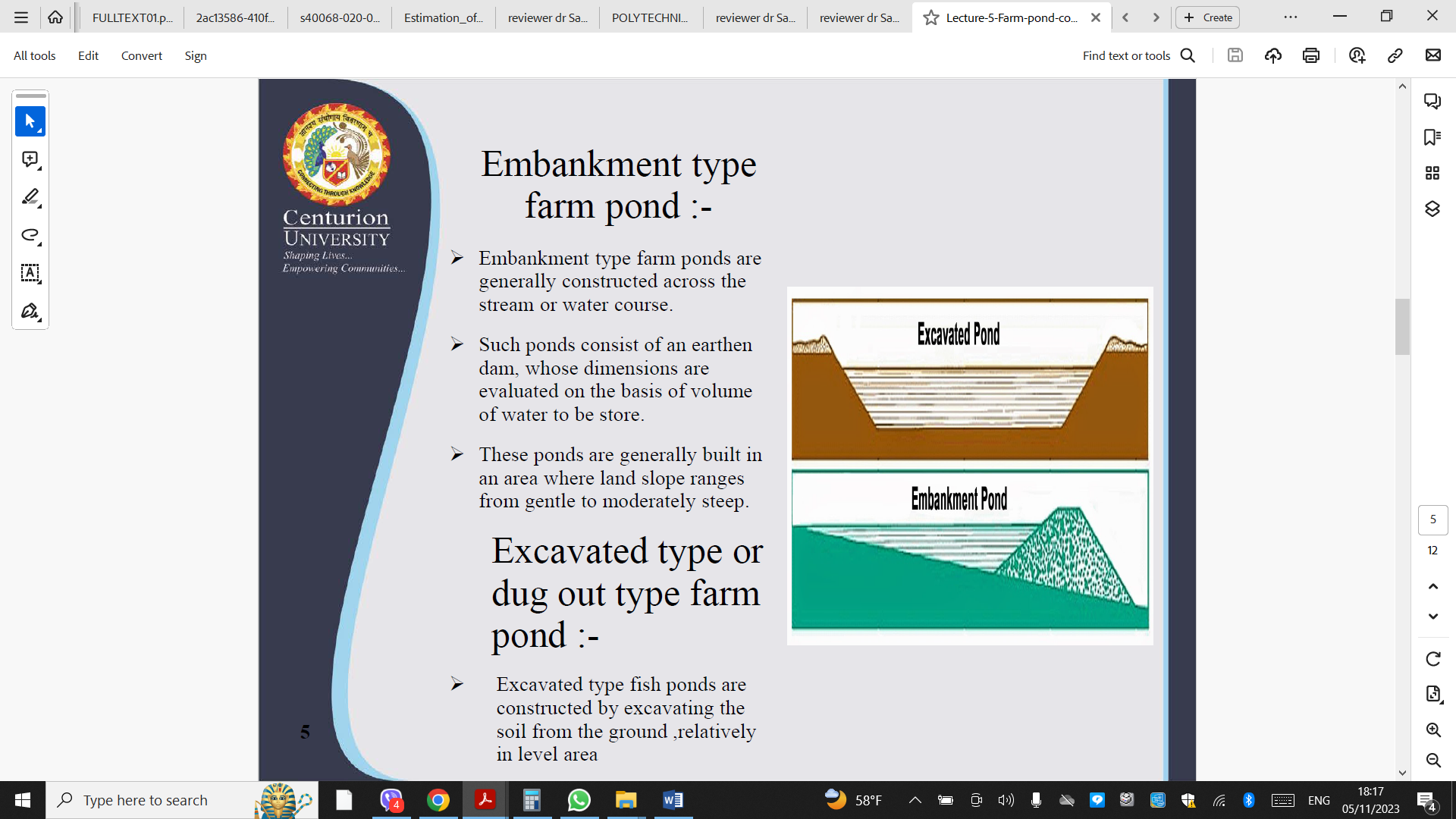
**Kinds of Ponds**

There are two basic types of ponds:

1. **Embankment ponds,** built by placing the dam across a stream, are not recommended because they frequently wash-out.
2. **Excavated ponds** are made by digging either the pond itself or the surrounding area to form levees. Ponds of this type are recommended and easily constructed, particularly in areas of flat topography.



**Selecting the Pond Site**

Selection of the pond site is one of the most important steps in construction. A good pond site contains.

1. Level topography that provides for economical construction.
2. Soil with sufficient clay to hold water.
3. An adequate water supply.

Before making the final site selection, one should examine all potential sites considering economics, accessibility and safety. Economically speaking, construct a pond that provides the largest volume of water with the least amount of landfill. Liability is a final consideration. For example, what would happen if the dam failed causing loss of life or injury? The pond owner is normally held liable for downstream flooding and related damages caused by dam failure costly soil removal. In most instances, the maximum height of a dam should be 20 to 25 feet. Dams higher than this are expensive to build and frequently stratify in summer resulting in deep water areas unsuitable for aquatic life. Dams in Virginia should be high enough to provide a minimum depth of six feet year-round. Otherwise, dams must be high enough to compensate for continuous evaporation and seepage. Because a pond is simply a depression for holding water, the dam and bottom must be composed of soil which minimizes seepage. Clay soils are best for lining ponds because they minimize leakage. Sites containing gravel or sandy soils are unsuitable, often requiring costly earth moving. Limestone or shale areas are unsuitable because of possible fractures which create leaks. Swampy areas are poor sites because they are difficult to drain and costly to maintain.

**Water Supply**

The water supply must be sufficient to rapidly fill the pond and maintain a relatively constant water level—one that does not fluctuate greatly throughout the year. Ponds with large overflows of water flush essential nutrients. Small streams are satisfactory sources of water for most ponds

**(l)** The flow is sufficient to fill the pond and maintain the water level

**(2)** The stream is not subject to flooding

**(3)** The watershed is well vegetated

**(4)** The stream carries a little silt load, especially during flood periods.

When streams are used as a water supply, a wise precaution is to build the pond adjacent to the stream and have an inlet pipe which can be screened or closed as needed. This provides control over siltation. Another common water source for farm ponds is surface run-off (waters which seep across the surface after rains). Pond owners need about 3 acres of land for each acre-foot of pond (a surface acre foot of water one foot deep), except where sandy soils exist or rainfall is variable. In these situations, expert advice from professional.

**Basic Factors in Pond Design and Construction**

Selecting a suitable site for pond is important and preliminary studies are needed before final design and construction. Analysis and selection of pond sites should be based on landscape structure and associated ecological functions such as water source, climatological data, soils and vegetation.

1. **Landscape (Topography)**

The topography of a land is determined by survey. The importance and effect in pond design and construction as follows:

(1) It helps to determine the shape, size and type of the pond

(2) It helps to determine the quantity of earthen materials to be filled or cut

(3) It helps to determine the position of structural elements such as inlet and outlet

(4) It helps to determine labour cost

(5) It influences the method of filling and drainage of the ponds

(6) It helps to determine the characteristics of soil (sloping land has shallow soil, while flat land has deep soil)

(7) It determines the degree of erosion and amount of soil particles in the pond especially steep longitudinal and large catchments.

1. **Water source**

Generally, water sources for pond include rivers, stream, spring, wells, bore-hole, rain and underground water (preferably close to water table). The important of water sources on pond sitting as follows:

(1) It determines the level of pond productivity

(2) It determines pond depth

(3) It determines type of pond

(4) It determines the size and structural composition of the pond

(5) It influences the species of the fish to be cultured

1. **Climatological**

The importance of meteorological and hydrological (climatological) data as follows;

(1) It helps in the determination of height, size and capacity of dike

(2) It helps in determine amount or volume of water needed in the pond operation

(3) It influences the choice of pond and location

(4) It helps to determine the structural component of the pond

(5) It influences time of construction.

1. **Soils**

The importance of soils is as follows:

(1) It determines the suitability of sites for pond setting

(2) It determines pond productivity

(3) It determines structural composition of the pond

(4) It influences cost of design and construction

(5) It determines level of pond management

5. **Vegetation**

(1) It is used for assessment or indicators of soil property.

(2) It influences the cost of pond construction

However, accessibility, proximity to markets for aquacultural products, availability of suitable materials and labor, security of facilities and cost of power must be considered.

**Technical Consideration on Pond Design and Construction**

During the process of designing ponds, decisions on the following should be made.

(1) Total area of the pond water surface needed

(2) The length and the width of the pond water surface

(3) The water depth and the total pond depth at both the deep and shallow ends

(4) The slope of the dikes and the pond bottom.

(5) The size of the free board

(6) The width of dikes.

**The technical considerations include the following**

(a) Design steps

(b) Factors influencing the design

(c) Choice of components

(d) Quality control

**Design Steps**

The design steps should be included

1. Investigation of soil in foundation, evaluation of characteristics at field, in laboratory and estimation of volume.
2. Analysis and modification.
3. Presentation of estimates cost and final choice.

**Pond Design and Layout**

General considerations

1. Depends on the type of soil present and the intended culture practices.
2. The water source must be able to keep the pond full throughout the culture period.

1. Relatively shallow ponds are productive, but the shallow end should be at least 0.5 m deep to avoid invasion by weeds.
2. It is always desirable to place screens on pond inlets and outlets to keep out predators, insects, and unwanted fish, and to retain the cultured fish.
3. Every pond should be drainable.
4. Every pond should have an independent controlled inlet and outlet.
5. Excavation of a core trench should be done where soils are less suitable.
6. Perimeter and feeder roads are required to provide for movement of machines during construction and at harvest.
7. If you plan to drive on the dykes, build them at least 3 meters wide on top, and wider at the base.
8. Soil used to build dykes should always be compacted in layers.