



Illinois Heartland Library System

TO: IHLS Board of Directors
FROM: Leslie Bednar
DATE: April 18, 2024
RE: FY2025 IHLS Automated Materials Handling System (AMHS) Proposal

Background

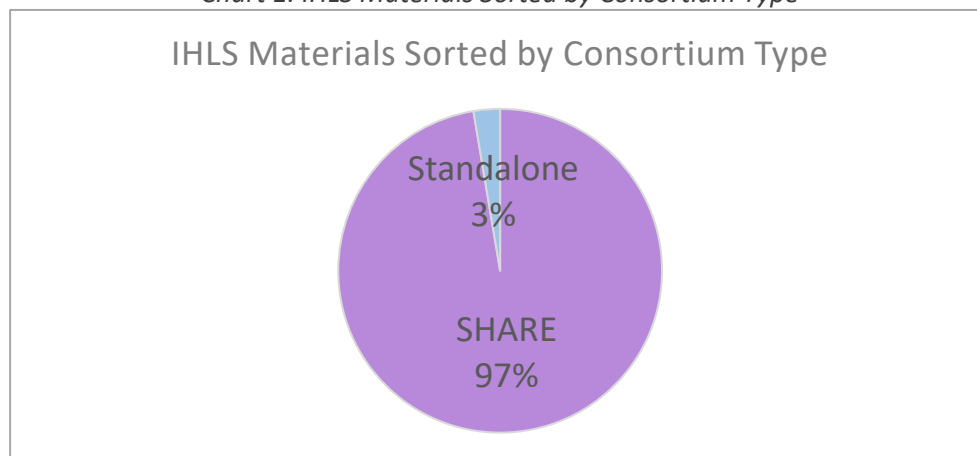
Illinois Heartland Library System (IHLS) staff have been discussing the potential benefits of an Automated Materials Handling System (AMHS) since January 2019, when previous IHLS Operations Director Susan Palmer visited the King County Library System and later the Chicago Public Library facility. With the increasing number of items circulated through delivery, concerns regarding material handling and staff shortages due to COVID-19, high turnover in part-time positions, and the challenge in rehiring these positions, an analysis was conducted to determine if an AMHS should be incorporated into IHLS operations. IHLS finance and operations staff met to determine the number of staff, the daily operations, and any potential savings we would see in the future.

Automated Materials Handling System Review

An Automated Materials Handling System (AMHS) is a tool, or system of tools, that removes the need for manual interaction to check in, check out, move, or sort materials.

Approximately 97% of materials sorted by IHLS Delivery staff are SHARE member materials (See chart 1.) When libraries use a shared ILS (SHARE) instead of a handwritten label (Standalone) in delivery, IHLS can use the information in our shared ILS (Polaris) to automatically sort those materials. That happens by scanning the barcode on the outside of the materials or the RFID tag.

Chart 1. IHLS Materials Sorted by Consortium Type



IMAGINING TOMORROW ~ DELIVERING POSSIBILITIES TODAY!

IHLS implementation of an AMHS would bring many potential benefits to members:

- **Long-term cost savings for SHARE member libraries.** The AMHS will route items with barcodes instead of labels, thus saving libraries miles of receipt paper tape annually. Our [website](#) has a receipt paper savings calculator for libraries to calculate their savings.
- **Faster delivery turnaround time after weekends and holidays.** With the AMHS sorting 97% of IHLS member materials, IHLS sorting staff can sort heavy loads, such as those following holidays or weekends, in a single day, eliminating backlogs.
- **More accurate sorting.** While sorting mistakes are not common every day, it does happen. When an item is sent to the wrong library in another hub, it may be over a week before the item ends up in the hands of the patron. The AMHS would further reduce this occurrence.
- **Pandemic-resistant sorting.** The low-touch nature of the AMHS would make disruption from future pandemics or similar emergencies far less likely.
- **More accurate data tracking and statistics.** The AMHS will automatically update the item's status in Polaris. This lets the library know precisely where their item is in the transit journey.
- **Potential for branch-level sorting for SHARE member libraries.** IHLS is currently exploring the feasibility of a feature that could potentially benefit SHARE members. The idea is that SHARE members could choose to have IHLS sort their incoming materials at the branch level, which would reduce the amount of time required for member library staff.

AMHS implementation would also bring many potential benefits to IHLS:

- **Reduced long-term operating costs.** Personnel costs would be reduced through decreased total staff hours needed. Attrition-related staff reductions will likely accomplish this. Our biggest concern is the staff turnover. We need to hire replacement sorters frequently; For example, we've had to hire and onboard one sorter, on average every two months for the past year, to keep the 12 positions across IHLS hubs filled. That amounts to a turnover rate of roughly 50%. There is a definite cost to IHLS for that—about \$1,000 per sorter for onboarding costs and the administration costs of onboarding and training. This does not include any termination costs.
- **Faster delivery turnaround time after weekends and holidays.** With the AMHS sorting 97% of IHLS member materials, IHLS sorting staff can sort heavy loads, such as those following holidays or weekends, in a single day, eliminating backlogs.
- **Increased efficiency through increased speed.** The number of items sorted per hour would be much higher, helping staff ensure that all items are sorted daily. The typical AMHS can sort, on average, 2,500 items per hour with multiple operators and 1,200 items per hour with a single operator, and current IHLS manual sorting can average 350–450 items per hour per sorter.
- **Reduced likelihood of chronic injury.** Sorting bins attached to an AMHS can be adjusted to employees' physical needs. This provides a safer, ergonomically adjustable workstation for staff, preventing injuries and worker compensation claims.

- **No major changes to current infrastructure.** The machines that we are considering require one single electrical outlet and 1 data cable. IHLS will not need to undergo any major changes to install these machines. One vendor reports that their machine uses less energy at peak operation than a typical hair dryer uses.

AMHS vendors have reported an average life span of 10 years, but many users have indicated that machines' lives are nearing 15–20 years with no current plans for replacement.

Current Delivery and Funding Challenges

In central and southern Illinois, IHLS is the heart of interlibrary delivery, providing pickup, sorting, and delivery of library items at no cost to our 520+ member libraries. We also facilitate the transport of interlibrary loan items from IHLS member agencies to RAILS (Reaching Across Illinois Library System) and CARLI (Consortium of Academic and Research Libraries in Illinois) members and back again. IHLS delivery drivers are on the road Monday–Friday, 5 a.m. to 2 a.m., to get items to patrons as soon as possible.

Delivery service is provided free of charge to IHLS members by the IHLS General Fund. Delivery is a component of the Illinois Statute [\(75 ILCS 10/\) Illinois Library System Act](#), which funds the IHLS General Fund. General Fund annual revenue is determined after each 10-year census, with the next review anticipated in 2031. This means that IHLS's current funding will remain flat until FY2031, and IHLS cannot tax levy for additional revenue.

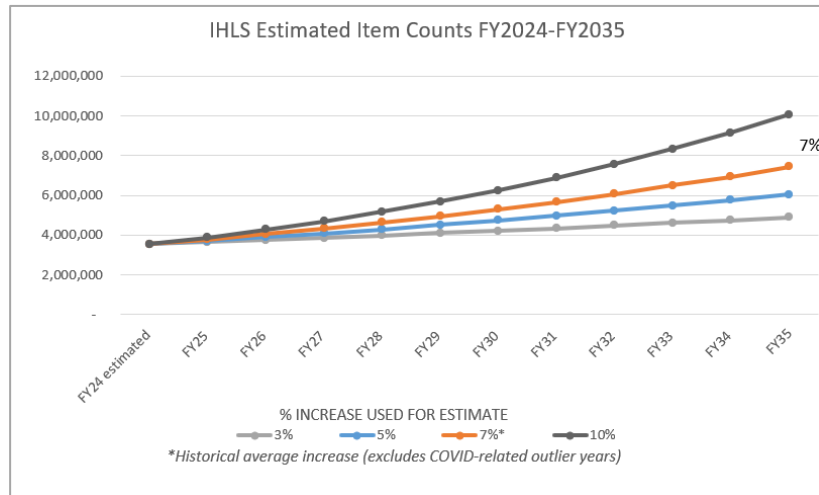
IHLS-member libraries do not pay fees to be members of IHLS. Therefore, members would not see any expenses related to purchasing or operating the AMHS. We do not plan for any portion of the costs of the AMHS to be passed along to SHARE-member libraries either, as SHARE would not be paying for the AMHS; IHLS would.

Projected Delivery Volume Estimated Using IHLS Historical Data

IHLS determined the historical average change in delivery volume by analyzing the last 12 fiscal years, FY2013 to FY2024 (this year). The COVID-19 pandemic outlier years (FY2020, FY2021, and FY2024) were removed, and the average increase was 7%. The current year, FY2024, has shown unprecedented growth in delivery volume, at 28% (accurate through Feb. 2024 and estimated through June 2024). Under the assumption that FY2024 is the year patrons are finally back in libraries at pre-pandemic levels, the growth data from this year was also excluded.

Delivery Volume (Item Count) Is Projected to Grow 7% Each Year

Chart 2. IHLS Estimated Item Counts (Delivery Volume) FY2024–FY2035

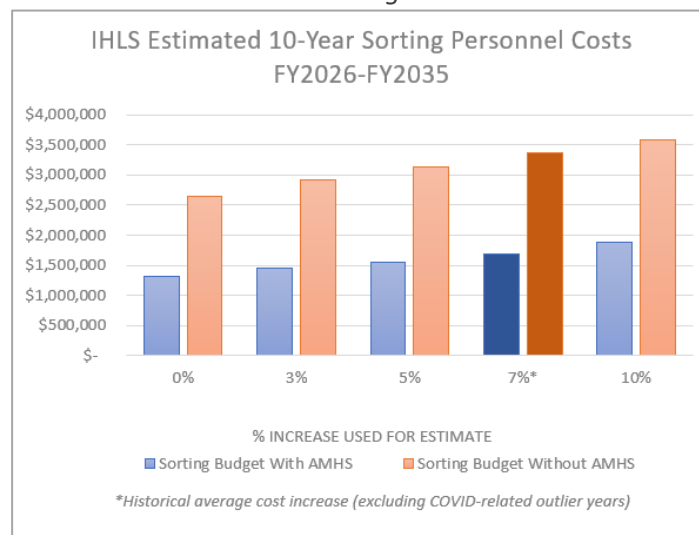


Over the next eleven fiscal years, delivery volume is projected to grow 7% year after year, resulting in a projected rise from 3.5 million items to around 7.4 million by FY2035. (See chart 2.)

Alternate Projections. Projections are also provided for a more conservative 3% and 5% item volume increase and a 10% increase. A 10% increase is the average with the COVID-19 pandemic decreases removed while leaving in the 28% increase in growth in FY2024. (See chart 2.)

Delivery Sorting Personnel Costs Are Projected to Increase, and an AMHS Greatly Impacts That Increase

Chart 3. IHLS Estimated 10-Year Sorting Personnel Costs FY2026–FY2035

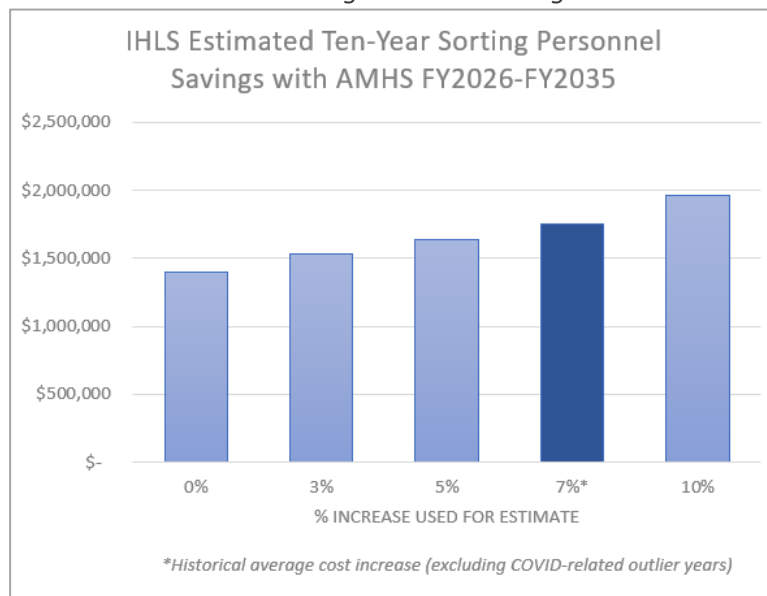


IHLS also projected costs for IHLS Delivery sorting personnel for the same period, using the 7% volume growth plus considering factors such as inflation and minimum wage rates. Estimated costs of IHLS Delivery sorting personnel are expected to increase between approximately \$1.6 million and \$3.4 million over the next ten years following implementation, FY2026 to FY2035. (See chart 3.)

Alternate Projections. Projections are also provided for a more conservative 3% and 5% item volume increase and a 10% increase. Projections were also calculated using a 0% item volume increase, demonstrating the cost increase not associated with item volume. (See chart 3.)

Projected Savings in Sorting Personnel Costs Under the Condition of an AMHS

Chart 4. IHLS Estimated Ten-Year Sorting Personnel Savings with AMHS FY2026–FY2035



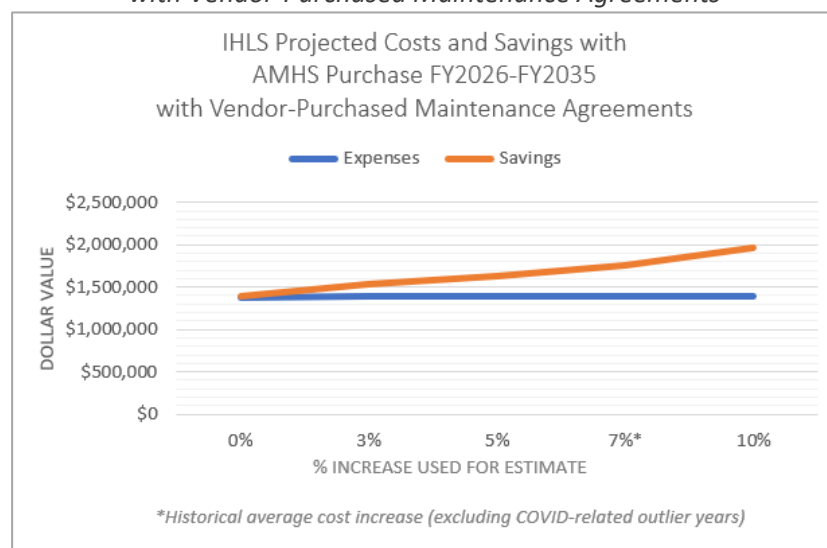
Finally, IHLS graphed the difference in the IHLS delivery sorting personnel costs under an assumption that an AMHS was to be required—differences that became apparent during the Ten-Year Sorting Personnel Costs projections analysis. The 7% historical average delivery item volume increase was used for the projection, as were the additional conservative estimates of 0%, 3%, and 5%, and a high estimate of 10%. The projections were made under the secondary assumption that savings would not be seen during the first year of the installation of the AMHS. (See chart 4.)

Should IHLS acquire an Automated Material Handling System, estimated savings in IHLS delivery sorting personnel costs are expected to be between approximately \$1.3 million and \$1.9 million over the next ten years, FY2026 to FY2035. (See chart 4.)

Automated Materials Handling System Acquisition Costs

IHLS will bear the expenses related to the one-time purchase, implementation, and maintenance of the machines. The IHLS General Fund Reserve balance and possible future grants will fund the project. The one-time purchase includes bid price and add-on features at an estimated \$725,000, while implementation costs cover barcode duplication, legal review, and electrical and data work estimated at \$127,990. The projected expenses for maintenance outsourced to the AMHS vendor are anticipated at \$519,377 over the next ten years. (See chart 5.)

Chart 5. IHLS Projected Costs and Savings with AMHS Purchase FY2026–FY2035 with Vendor-Purchased Maintenance Agreements



***Numbers listed in the chart above include vendor-purchased maintenance contracts. IHLS staff estimate in-house maintenance to cost approximately \$200,000 over the next ten years, and maintenance costs would decrease by approximately \$319,377.*

Member Library Costs

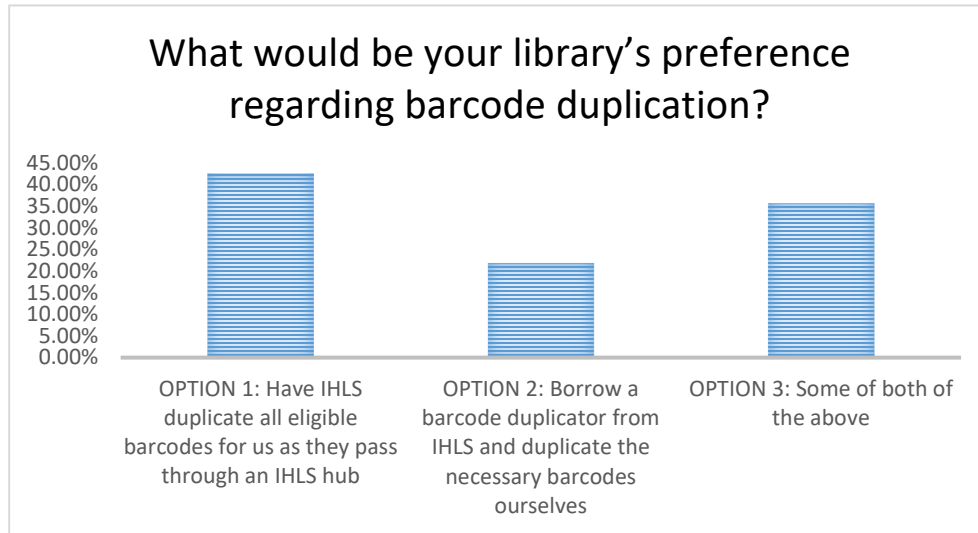
The only possible costs that we anticipate for libraries are the materials and labor involved in barcode duplication of items if (and only if) libraries are SHARE members for whom all of the following is true:

- They have item barcodes on the inside of the item.
- They do not have an RFID (Radio Frequency Identification) tag. (To take advantage of an AMHS, barcodes must be on the outside of the item if they do not have RFID tags.).
- Those items are circulated outside SHARE member libraries (we will only need to duplicate barcode items as they are circulated outside of a SHARE library).

IHLS staff are currently evaluating how many libraries this will affect. Some libraries have indicated that they would like the help of IHLS staff to duplicate barcodes on their items using barcode duplicator equipment. Other libraries have indicated they would like to borrow the

that equipment for their staff to accomplish this task. Of the libraries that replied to the duplication survey, the largest percentage of members indicated that they would like IHLS to complete this for them. We have included these estimated costs for the barcode duplication project in the one-time implementation costs above.

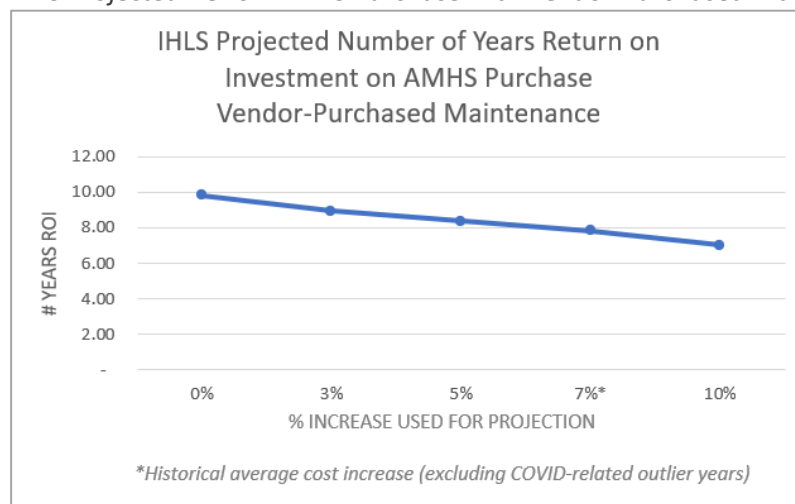
Chart 6. IHLS Survey Results on Barcode Duplication Preferences.



Return on Investment (ROI)

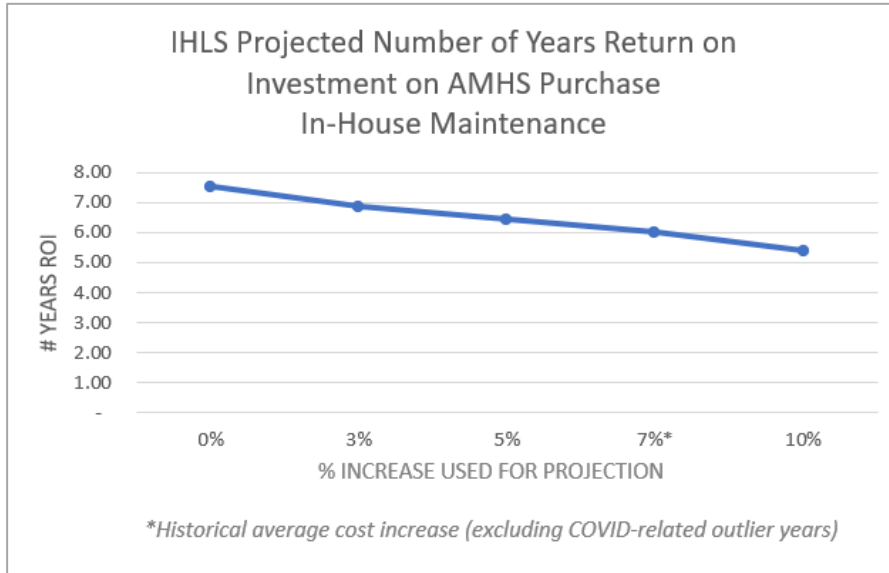
The projected return on investment will vary based on how item-volume-count growth continues for IHLS delivery staff. At 0% volume growth over a current fiscal year, a return on investment would be seen in 9.81 years; if volume growth continues at 7%, as historically shown, a return on investment would be seen in 7.82 years. (See chart 7.)

Chart 7. IHLS Projected ROI on AMHS Purchase with Vendor-Purchased Maintenance



If IHLS staff determine that maintenance should be completed in-house instead of using vendor-purchased maintenance contracts, the ROI projections would be sooner than eight years. (See chart 8.)

Chart 8. IHLS Projected ROI on AMHS Purchase with In-House Maintenance



FY2024 Request for Proposal (RFP) Responses

IHLS Automated Materials Handling System costs are currently included in the proposed FY2025 General and Capital Projects fund budgets for \$852,990. This total includes:

- One-time purchase of AMHS at \$725,000
- One-time implementation costs at \$127,990

The RFP for this project was posted in January 2024, and we received three total bids at the bid opening on Tuesday, March 19, 2024. The bid results are listed below:

<u>Vendor Name</u>	<u>Carbondale</u>	<u>Champaign</u>	<u>Edwardsville</u>	<u>Total Bid Price</u>
Lyngsoe	\$126,714.00	\$267,725.00	\$267,725.00	\$662,164.00
MK Solutions	\$203,150.00	\$284,350.00	\$311,650.00	\$799,150.00
Tech Logic	\$213,786.38	\$388,655.49	\$392,029.92	\$994,471.79

Recommendation

Above, please find the detailed list of bidders and their proposed pricing for your review. IHLS staff recommends awarding Lyngsoe Systems for the Automated Materials Handling System project as they were the lowest responsible bidder.

There are over 600 installations of the current generation of equipment that Lyngsoe is proposing. This generation of machines has been installed for the last eight years but Lyngsoe Systems has been installing automated equipment for libraries for over 20 years. Some of the installations that use an automated materials handling system include:

<u>Name</u>	<u>Location</u>	<u>Estimated Annual Volume Sorted by AMHS</u>	<u>Automation Platform</u>
Marigold Library System	Alberta, Canada	2 million items	Polaris
Clackamas County (LINCC)	Clackamas Co, Ore.	1.25 million items	Symphony
Arapahoe Library District	Centennial, Colo	4.7 million items	Sierra
Seattle Public Library	Seattle, Wash.	11.5 million items	Horizon
San Francisco Public Library	San Francisco, Calif.	720,000 items	Sierra
Decatur Public Library	Decatur, Ill.	173,000 items	Polaris

While many of the references listed above include public libraries, this is because many library systems do not have a majority of the library members on one automation consortium like IHLS does.

With the purchase of the AMHS the first year includes the extended service plan with preventative maintenance, 24/7 hotline, and extended parts warranty. Chart 5 above includes the projected expenses for maintenance if outsourced to the AMHS vendor.

The base price of the Lyngsoe machine is \$662,164. The proposed \$62,836 of additional add-on features may include:

<u>Name</u>	<u>Cost</u>	<u>Purpose</u>
Ergo Trolleys	\$1,275 each	Rolling cart for materials sorted for different configurations. Staff could roll these carts rather than carrying tubs.
Ergo Feeder	\$8,500 each	Auto-feeder for loading materials on the machine. Staff could place materials on the feeder and walk away from the machine. The feeder would need to have materials hand loaded on it.
Bottom Barcode Scanners	\$3,710 each	Bottom scanning capability. Staff would not need to locate the barcode on outside of materials before placing on sorting machine.

Color Graphical System Displays	\$7,712 each	Full visibility of the sorting machine in a color graphical display. Colors indicate an items status.
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Our goals for staff-managed vendor negotiations include:

- final determination of which additional add-on features and at what price
- final determination of vendor purchased maintenance contracts and at what price

This proposal includes the approval of a one-time purchase of Lyngsoe equipment which includes the bid price and add-on features at an estimated total of \$725,000. The awarded bid will need final approval at the May 2024 board meeting. We want to clarify that the additional features requested by IHLS staff may be included in the project as long as the total cost stays within \$725,000. With your approval of this purchase, as the IHLS Executive Director, I will authorize the inclusion of these additional components without board approval. However, if the additional features would exceed the budget of \$725,000, then the matter will be presented to the Board for consideration.

Thank you for carefully reviewing our project proposal, and please let me know if you have any comments or questions.